OCTOBER, 1957

Commercial Fertilizer

and PLANT FOOD INDUSTRY

How to Save Money in AMMONIATION

SEE PAGE 19

QUIZ

For Multiwall Bag Buyers

"How Does Your Packaging Operation Rate?"

Perhaps we may be able to help you to arrive at the right answers in order to achieve higher production at lower costs.

KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary

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☐ O.K. Kraft... Help me to answer your Quiz. Please have representative call.

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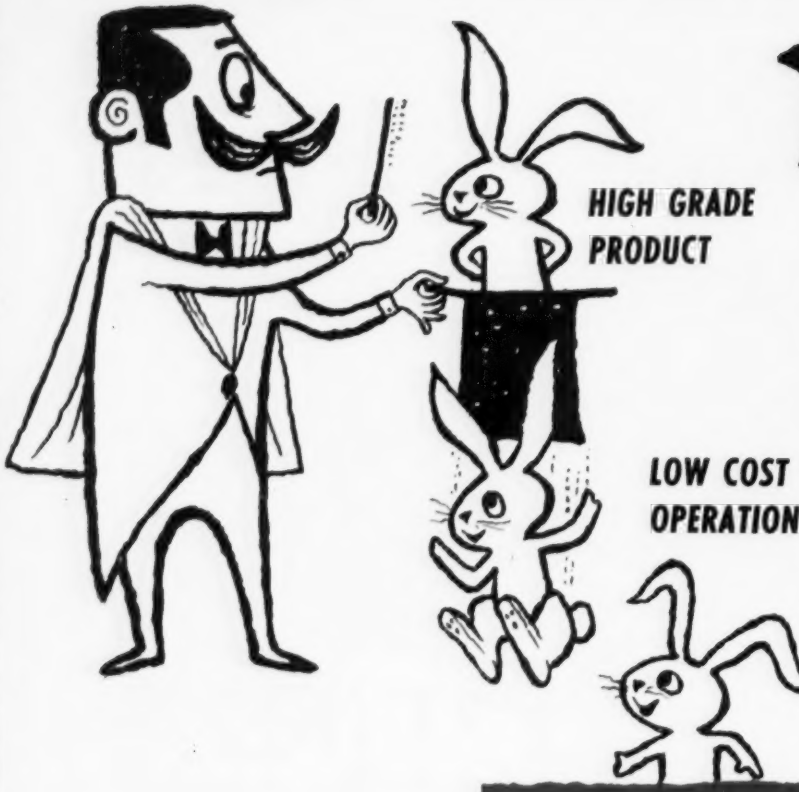
PRODUCT MFD_____ NAME_____



DiaPhos... the MAGICIAN makes 25,000 TON AMMONIUM PHOSPHATE PLANTS that Pay Off!

WEATHERLY DiaPhos PROCESS

DiaPhos does big things for big plants, too. But the thing that surprises the industry is that DiaPhos makes practical and profitable the operation of one or a string of 25,000 ton integrated ammonium phosphate plants, producing their own sulphuric and phosphoric acids.

These plants operate with a minimum of manpower and turn out granular goods through 8 and on 10 mesh screen. They permit offering premium grades: 16-20-0; 14-14-14; 13-39-0; 6-24-24; 11-48-0 . . . for example.

The Weatherly DiaPhos plants do all this with a minimum of investment, from the cheapest raw materials, so they pay off handsomely. Ask us about this. The full story is even more astonishing than the quick outline above. Actually, a new page in fertilizer history is being written by Weatherly.

The D. M. WEATHERLY COMPANY

Industrial Engineers and Builders

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Commenting Freely

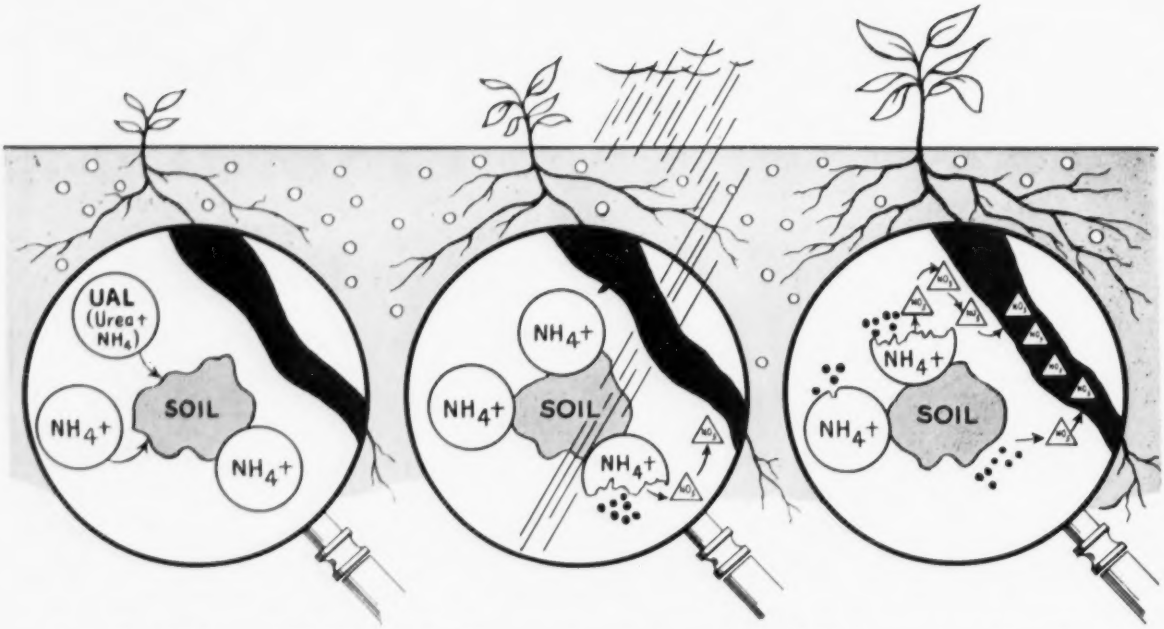
by Bruce Moran

"No man has the right to destroy soil even if he does own it in fee simple." This startling concept is from the USDA 1938 Yearbook "Soils and Men" and quoted again in "Soil," the 1957 Yearbook. The rest of the quote reads: "The soil requires a duty of man which we have been slow to recognize."

That second sentence is even truer than the first. We have, indeed, been slow to recognize that all of us have a responsibility to conserve the soil's fruitfulness. It is the basic form of conservation. The fact that this statement hits the eye with terrific impact 20 years later proves how little it is understood as a principle.

Our industry has preached it, and we have made progress, multiplying the active plant foods going into the soil nation-wide, and world wide. But in a nation where the population will increase 50% in one generation that is not enough.

We still have a tremendous job of selling to do, for the sake of the generations ahead.



1. Du Pont UAL provides fertilizer mixtures with urea and ammonium nitrogen. In the soil, urea quickly converts to ammonium nitrogen, which attaches to the soil particles.

2. This ammonium nitrogen resists leaching. Nitrogen is made available to the plants when soil bacteria convert the ammonium nitrogen to nitrate nitrogen.

3. Under normal growing conditions, the conversion of ammonium nitrogen to nitrate nitrogen occurs at about the same rate that growing plants demand this nutrient nitrogen.

How nitrogen from Du Pont **URAMON**® Ammonia Liquors resists leaching . . . nourishes crops to maturity

Fertilizers ammoniated with Du Pont UAL have extra sales appeal because they are composed of two highly efficient forms of nitrogen. These forms—urea and ammonium—supply nitrogen that nourishes plants at the rate required for maximum growth and yields.

Nitrogen from Du Pont UAL resists leaching—remains in the root zone where plants readily absorb it. Thus, on the basis of units of nitrogen actually available to plants, UAL is a very economical investment.

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- Safe in granulation . . . no danger of flash fires and less stack. Gives firm, uniform, stable granules, best for storage and application.
- Won't corrode regular fertilizer manufacturing equipment, including ordinary steel and aluminum.
- Gives mixed goods better "feel"—minimizes caking, segregation and dusting.
- Suitable for either batch or continuous mixing.
- Prompt, dependable delivery enables you to schedule your production with confidence.

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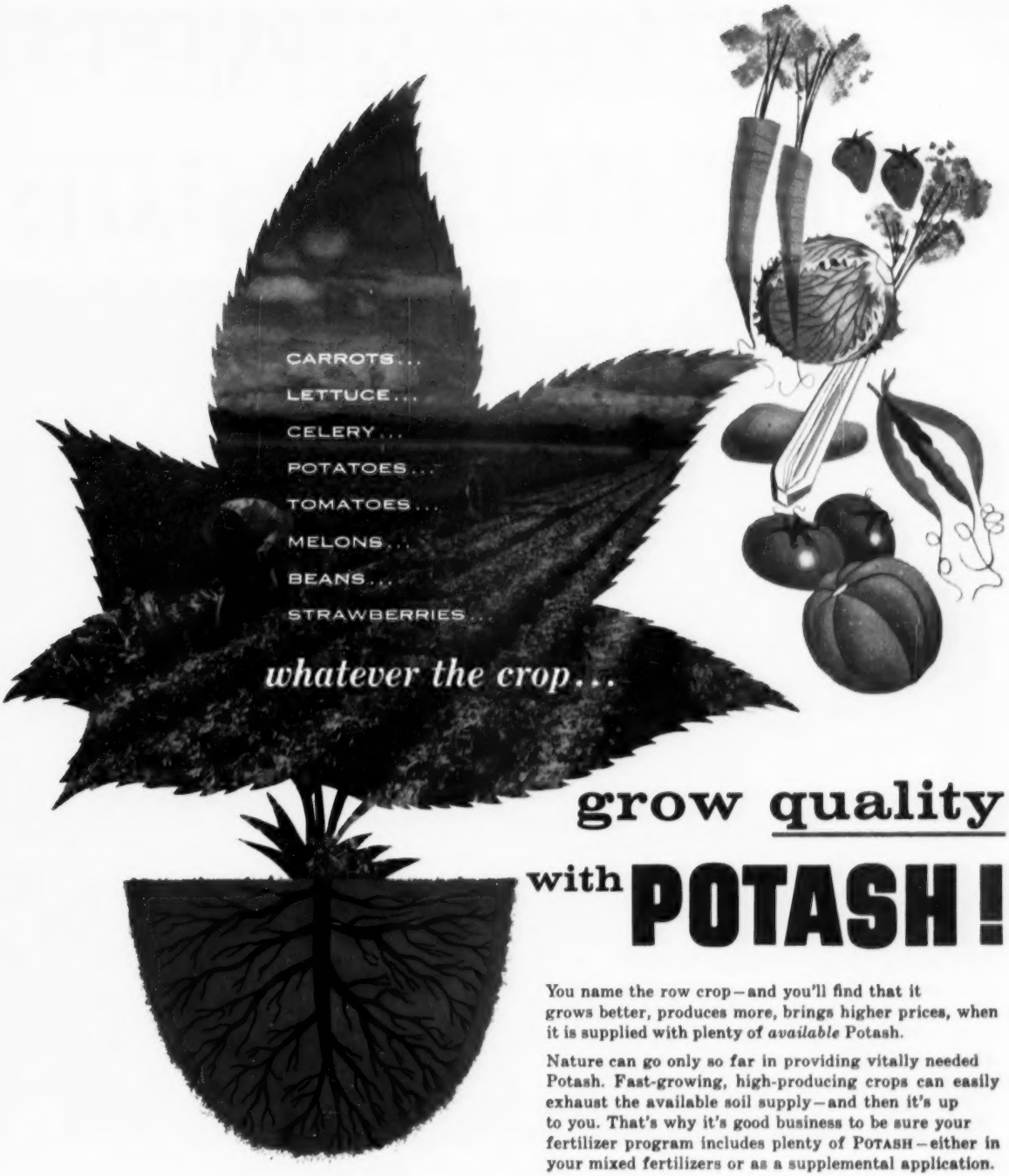

grow quality with POTASH!

You name the row crop—and you'll find that it grows better, produces more, brings higher prices, when it is supplied with plenty of *available* Potash.

Nature can go only so far in providing vitally needed Potash. Fast-growing, high-producing crops can easily exhaust the available soil supply—and then it's up to you. That's why it's good business to be sure your fertilizer program includes plenty of POTASH—either in your mixed fertilizers or as a supplemental application.

American Potash & Chemical Corporation is a basic supplier of Potash. Consult your fertilizer dealer today and be sure to specify plenty of TRONA® POTASH, *the vitally needed plant food.*

American Potash & Chemical Corporation

TRONA

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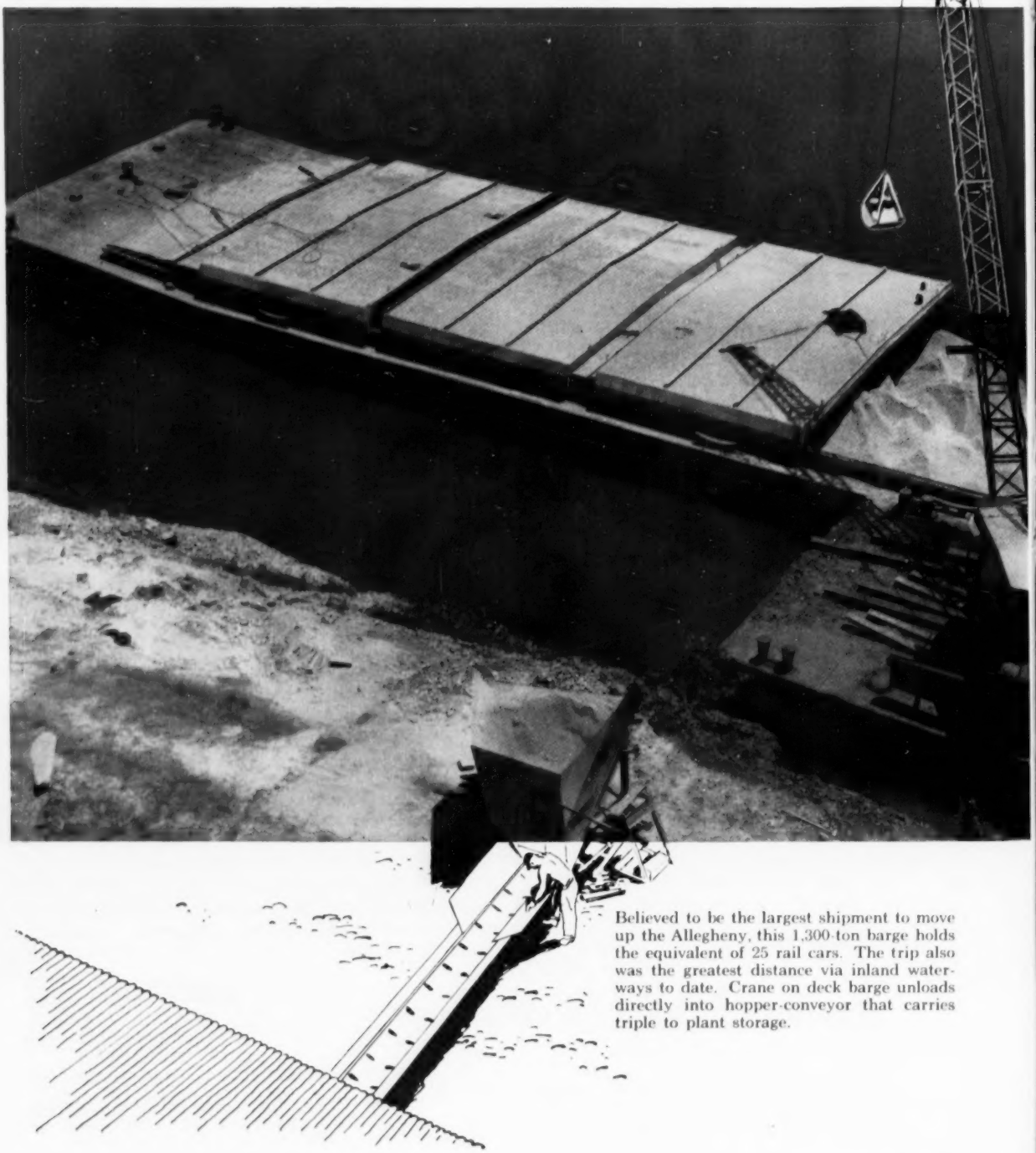
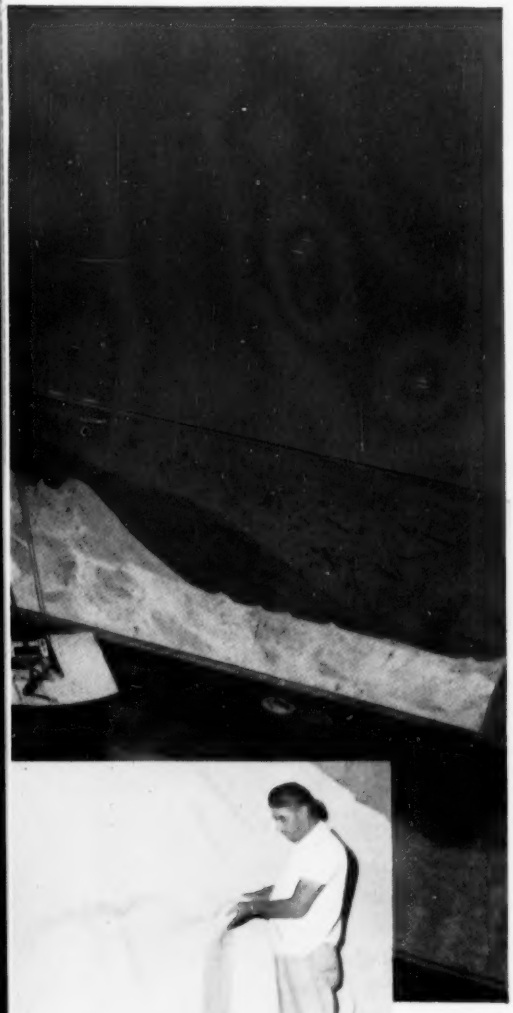
FIRST BARGE SHIPMENT OF UNLOADS AT EASTERN STATES'



Believed to be the largest shipment to move up the Allegheny, this 1,300-ton barge holds the equivalent of 25 rail cars. The trip also was the greatest distance via inland waterways to date. Crane on deck barge unloads directly into hopper-conveyor that carries triple to plant storage.

TRIPLE SUPERPHOSPHATE KITTANNING PLANT



International's water-routing pioneers another first; pushes barges up the Allegheny River to slash shipping costs

When this 1,300-ton barge of triple tied up at Kittanning, Pa., shipping history recorded another first . . . and costs at the Eastern States Farmers' Exchange plant took a substantial drop.

"International has proved that barge shipments to Kittanning are practicable," said J. Raymond Myers, production manager of Eastern States' Fertilizer Department. "This shipment of triple super brings immediate savings in shipping costs —savings that our plants at Cambridge (Mass.), York (Pa.), and Wilmington (Del.) already have been realizing."

For International, the 2,400-mile trip up the Mississippi, Ohio and Allegheny Rivers was a typical venture in water-route pioneering . . . still another example of service tailored to a customer's needs.

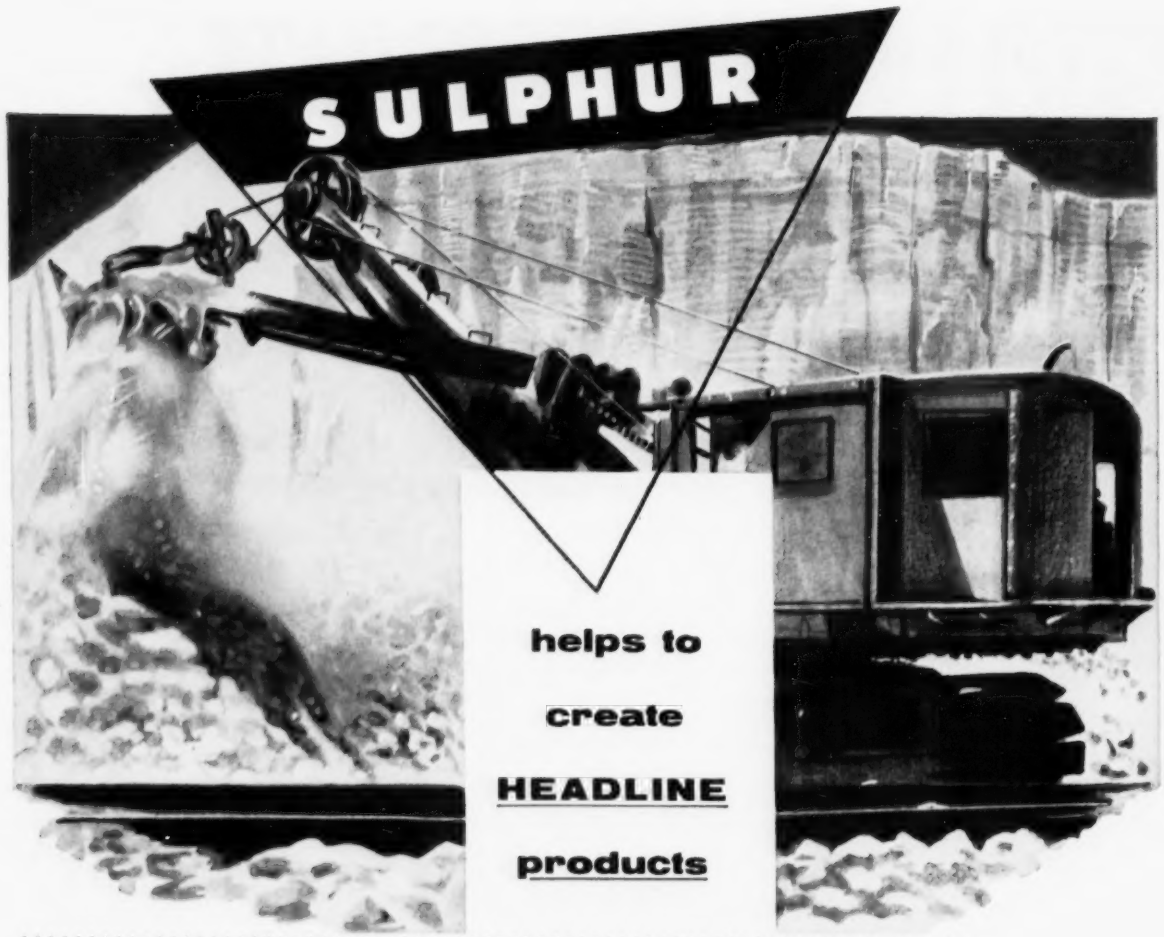
Why not share the benefits of International's attention to service and delivery . . . plus superior product quality. Write or wire for full information.

We'll be getting more of our triple by barge," says Kittanning plant manager Curtis H. Kelso, shown here examining International's barge-shipped triple. Consistent, uniform particle size keeps dust and setting-up problems to a minimum.

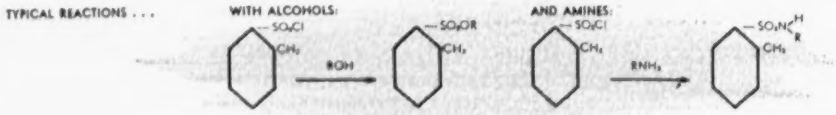
Eastern States has been a leader in high-analysis mixed goods. J. Raymond Myers, production manager of Fertilizer Department, right, and Clyde F. Grimm, manager of the York plant, check texture of their granular 8-16-16 fertilizer.

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

PHOSPHATE CHEMICALS DIVISION . . . . 20 N. WACKER DRIVE, CHICAGO 6, ILL.



o-TOLUENESULFONYL CHLORIDE*



Industry has a new working tool in o-Toluenesulfonyl Chloride. This 98% pure ortho isomer can be used in building molecules for use in a wide variety of new products, from dyestuffs to pharmaceuticals; from plasticizers to herbicides. It is even possible that it is now being used in products you are making or have recently acquired.

From the chemical name of o-Toluenesulfonyl Chloride it is obvious that sulphur is a component of this compound . . . added evidence of the important role Sulphur plays in our industrial economy.

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Texas Gulf Sulphur Co.

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JUST AROUND THE CORNER *by Vernon Mount*

THE BOOM AHEAD unfortunately, will bring inflation along with it in the normal course of events. They expect a slow rise for five years, then a great rise – based on the fact that we have a boom in people, and people make markets.

250,000,000 PEOPLE by 1970 means, of course, a sharp rise in poulation every year. Already we have crossed the 171,000,000 line. And there is doubt that all industry will keep up. Plenty are building ahead "because it will cost more 10 years from now" – but there can be scarcity, especially in foods. We have no great added acreage to till, and must count on better methods, slow to come, to make the static acres feed a zooming populace.

This is no time to sit on your hands!

Yours faithfully,

Vernon Mount

The A.A.C. Co. Plant at Carteret, New Jersey

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To meet your "quick" or "long term" requirements for a variety of chemicals, depend on the A.A.C. Co. You can count on uniform quality and guaranteed purity through rigid laboratory control. You'll get expert assistance from skilled research people in developing "specials" for unusual projects. And you can count on prompt service.

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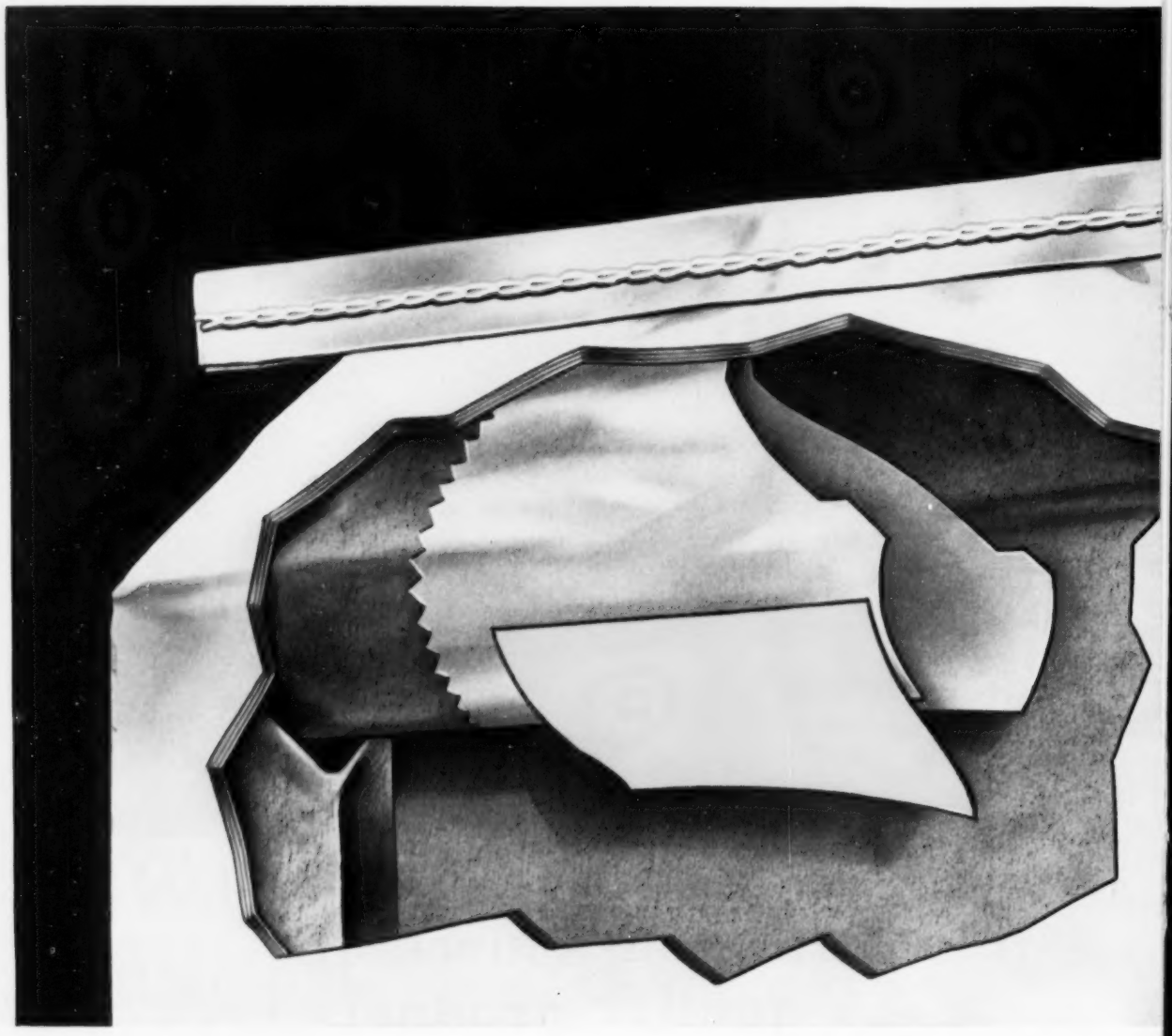

. . . Magic Yellow sewn

An ALL-NEW concept in valve construction . . . "DUETTE" is actually *two valves in one* with a DOUBLE CHECK ACTION. Thoroughly tested and proved siftproof, without packing trouble.

There's never been a sewn multiwall valve like it. It's NEW . . . not just another way of shaping, creasing, notching or slitting . . . but an *addition* that acts as a valve-on-a-valve, giving double sift protection.

Bemis "DUETTE" Valve Multiwalls, tested in full-scale production for over a year, have proved their superiority over other sleeve valve bags for all grades of fertilizer—granular, pelletized or pulverized.

Try the Bemis "DUETTE." You'll be delighted with the results.

Write us for the *complete* story, or ask your Bemis Man. Samples on request.

TENNESSEE CORPORATION

PRIMARY PRODUCERS OF FERTILIZER CHEMICALS

Including:

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- MANGANOUS OXIDE
- COPPER SULFATE
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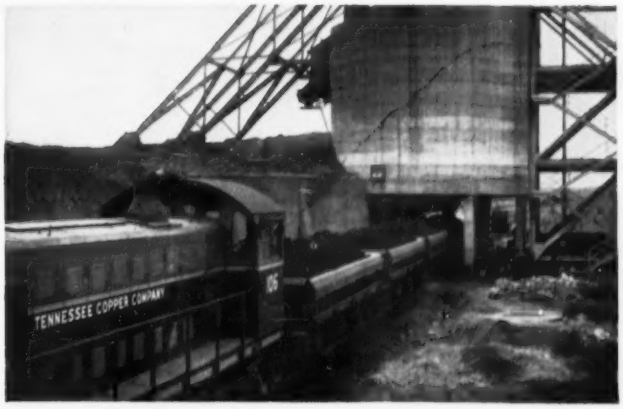


YOU are assured a *consistent* basic source of quality materials.

YOU cut costs with combined carloads from one *basic* source.

YOU can save money, time, plant space and effort through the use of our custom formula mineral mixture service.

WE back up our products with service, research and technical assistance.

Over 30 years experience in nutritional trace element manufacture, research and application to mixed fertilizers

NUTRITIONAL TRACE ELEMENTS ARE OUR BUSINESS.

FOLIAR NUTRITIONAL PRODUCTS INCLUDE: **NU IRON, NU-Z, NU-M, ES-MIN-EL**

For further information please make requests on your company's letterhead.

TENNESSEE TC CORPORATION

617-629 Grant Building, Atlanta, Georgia

Four USDA Labs Authorized

Facilities for research will increase and be brought up to date within the next year thanks to Congressional appropriations for four USDA laboratories.

The new National Seed Storage Laboratory will be built at Ft. Collins, Colo., to store germ plasm for use in developing better crops. ARS horticulture, soils, and water experiments will be conducted at Weslaco, Texas. Utilization of fruit and vegetable crops will be studied at a new building in Winter Haven, Fla. And a poultry brooder house will be constructed at the Agricultural Research Center, Beltsville, Md.

The seed laboratory will be constructed on the Colorado State University campus on a site made available through the institution. Independently controlled storage chambers for seed, a seed-germinating laboratory, and office space will be in the new two-story structure.

At Weslaco, there will be a one-story building with controlled variable temperature rooms for soil physics, chemistry, and fertility work.

Air-conditioned facilities will be built at Winter Haven, where frozen orange-juice concentrate was cooperatively developed by the Florida Citrus Commission and USDA. There will be constant-temperature storage rooms. And one section will include a pilot plant for preparing citrus crops, under controlled conditions.

The new poultry brooder house at Beltsville will provide scientists with more consistent environment for present experiments. Reduction of variables will help researchers obtain results faster since experiments will require less replication to check environmental effects. The house will be made of concrete and cement block with brick facings. There will be aluminum awning-type windows to reduce maintenance requirements.

USDA Has Not Tested "Green Plasma"

The U.S. Department of Agriculutre has reported that its turf specialists have never tested a product called "Green Plasma," contrary to claims made in an advertisement that appeared recently in a number of newspapers in various parts of the United States.

Arcadian® News

Volume 2 | For Manufacturers of Mixed Fertilizers | Number 10

How to Save Money in AMMONIATION

New Ways to Cut Costs and Improve Output

More and more fertilizer manufacturers are producing better fertilizers at lower cost by initiating a few simple, inexpensive changes in their ammoniation methods, with the help of Nitrogen Division, Allied Chemical, Technical Service.

For example, proper selection of the correct nitrogen solution for the particular operation can effect substantial economies in many ways. A technical service man can help you choose the solution that fits your exact needs from the great variety of solutions developed and produced by Nitrogen Division.

Using the Nitrogen Division solution best adapted for specific fertilizer manufacturing programs can result in basic benefits.

1. *Lower cost per unit of nitrogen and other plant foods in the fertilizer.*
2. *Lower freight rates per pound of nitrogen in the more concentrated solutions.*
3. *Increased output of ammoniated superphosphate and mixed fertilizer in tons per hour from labor and equipment.*
4. *Fume reduction, resulting in reduced loss of nitrogen and better working conditions for labor.*
5. *Better physical condition of complete mixed fertilizers at lower production cost.*
6. *The use of more normal superphosphate and less triple superphosphate.*
7. *A low ratio of neutralizing ammonia to total nitrogen and less sulphuric acid requirement.*

Nitrogen Division, Allied Chemical, produces many different nitrogen solutions from which you can select those best suited to your ammoniation methods and equipment. It pays to use the right solution.

Nitrogen Division technical service men often suggest minor changes in equipment and operating methods to effect savings in ammoniation costs.

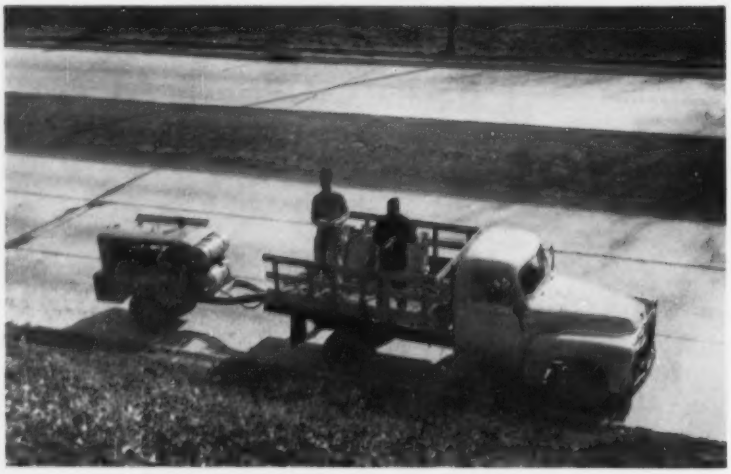
Simple adjustments, such as insulating pipelines and blowing back pipelines during non-operating hours in cold weather, have permitted the use of concentrated solutions winter and summer. This avoids expensive seasonal plant change-over and enables the manufacturer to use the same method of producing high-quality mixed goods throughout the year.

Efficient ammoniation involves proper technique, equipment and materials. Nitrogen Division offers a complete line of nitrogen solutions from which selections can be made adapted to particular conditions. Nitrogen Division technical service men are experts in ammoniation. They also have a thorough knowledge of the entire operation of a fertilizer plant. Their advice is free to customers.

Get the facts from your Nitrogen Division salesman . . . or contact Nitrogen Division, Allied Chemical, 40 Rector St., New York 6, N.Y. Phone: Hanover 2-7300.

Arcadian News for Fertilizer Manufacturers . . . . . from NITROGEN DIVISION

Illustration at right shows how new methods are speeding roadside fertilization. Two men with air blast guns and a compressor, in addition to a truck and driver, apply granular fertilizer to 8 to 10 acres of roadside per hour. This encourages growth of turf, shrubs and trees, beautifies the right of way, prevents erosion, saves costly repair bills.



TONNAGE OPPORTUNITIES

ROADSIDE FERTILIZATION

Grass along our highways is a growing market for fertilizer. You can make this market grow faster by telling your local highway departments and road contractors about the benefits of fertilizer. The status of fertilizer use along highways is about where farm crop fertilization in the corn belt was 15 years ago. The market is ripe for development.

Thousands of New Acres

Our vast new highway program is adding thousands of acres of grassed roadsides every month. Most highway departments specify fertilizer for establishing grass, trees and shrubs. More and more of them are also learning that maintenance fertilizer applied every other year keeps established sod strong enough to prevent costly erosion, in addition to beautifying the roadside.

We have 380,000 miles of primary highways today, most of which are bordered by grass. Add to this the 41,000 miles of expressways, authorized by the new Federal Interstate Highway program, and roadside fertilization becomes a big tonnage market. Construction of these new roads over the next 15 years will require an average of 35 acres per mile. About a million acres of this will be seeded to grass and fertilized with complete fertilizer. And this grass will also need maintenance fertilizer. On better soils, this may be straight nitrogen; on poorer soils, mixed fertilizer will be needed. All in all, it is estimated that maintenance fertilizer for highways will amount to 250,000 tons per year.

Turf along many old roads needs maintenance fertilizer badly. The aim is to keep the sod vigorous enough to hold water, to prevent washing and to keep down weed growth, without getting such rapid growth of grass that more frequent mowing is required.

Arid land roadsides, of course, will not be fertilized. Areas of heavy rainfall and leached soil are the best market. But this includes most of the eastern two-thirds of the country, plus parts of the Pacific Coast. The new highways, with broader rights-of-way, and with more grading to expose poor subsoil, will need more fertilizer than older roads that followed ground contours.

New Methods and Equipment

Not all highway authorities realize the benefits of roadside fertilization in saving other maintenance work. Many of them do not know how to fertilize high cutbanks and steep ditches. New machinery and new methods of spreading fertilizer make these jobs fast and easy.

Roadside fertilization is only about 20 years old. A recent national survey shows that only 8 out of 41 states reporting gave a flat yes to the question, "Do you recommend fertilizer for maintenance?" Many are experimenting with the idea. Some states are going into extensive fertilization of grass as fast as they try out new hydraulic and air-blasting equipment and find out how well it works. At least 28 states are regularly using fertilizer along parts of their roadsides and in special trouble areas. Nearly all states use fertilizer to establish turf.

Granular fertilizer is the most popular for roadside application. It is easy to dissolve in water for hydraulic applicators. It handles and spreads well in air-blast equipment, and creates less dust.

Most states report using ratios of 1-1-1, 1-2-1, 1-3-1, and straight nitrogen fertilizer. A few have been using liquid fertilizer applicators. In acid soil areas of the South and the Northeast, lime is used in establishing grass, but seldom for maintenance. With the hydraulic method of application for new seedings, used in 20 states, lime, fertilizer, seed and water can all be mixed together and blown onto the soil, either before or after mulching, or with a mulch. For maintenance applications, the air-blast method is gaining ground, since no water supply is needed. The air compressor is hauled by the truck carrying the spreader crew. Two or three men in a two-gun crew can fertilize up to 8 or 10 acres of roadside per hour, reaching high cutbanks as well as steep slopes. Sanding trucks and regular agricultural fertilizer equipment are poorly adapted to roadside fertilization.

Use of fertilizer by highway departments is handled by maintenance engineers, right-of-way engineers or landscape engineers. The job of establishing new turf is done by contractors working under state specifications. You can promote highway turf fertilization in your area by contacting these men.

Useful Information

The American Roadbuilders Association and the National Plant Food Institute Roadside Task Force have assembled useful information that can help you sell this market. For details, write to Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N. Y.

Arcadian News for Fertilizer Manufacturers . . . . . from NITROGEN DIVISION

Many soils need LIME to make fertilizers pay!

To make sure your fertilizers produce maximum results, it will pay you to encourage your farmer customers to test their soils and use lime (or limestone) as needed. Lime reduces soil acidity. Lime also increases the availability of phosphorus to crops.

Throughout the humid areas, most soils are acid enough to need lime. This includes all states east of a line extending from the Red River in Minnesota to central Texas.

Yet, the tonnage of lime (or limestone) used by farmers today is down from its post-war peak in 1947. In Missouri, for example, farmers now spread only 2 million tons of lime per year, where they once used 3½ million tons per year. Over the country, farmers now apply only a third of the 78 million tons a year needed to maintain soil fertility for high crop yields.

Lime supplies calcium as a plant food as well as a means of reducing soil acidity. But many acid soils, especially those that are fertilized, supply enough calcium plant food for most crops except legumes. The great increase in the use of mixed fertilizers containing superphosphate supplies considerable calcium to the soil. Much of this is in the form of gypsum, which also provides sulphur, but does not reduce soil acidity. Limestone or lime is often needed to reduce soil acidity.

When soil is too acid to grow good crops, farmers often blame the fertilizer used for not producing expected results. In acid soils, soil bacteria action is slowed down. This speeds leaching of fertilizers and slows down release of plant foods from organic matter.

But the biggest disadvantage of soil acidity is its effect in making phosphorus unavailable to crops. This cripples fertilizer's ability to produce profitable yields.

Acid Soil Fixes Phosphorus

Among the many forms of phosphorus fertilizer materials, normal superphosphate is high in availability. Some phosphates are more soluble. Others, like rock phosphate, are only slowly available under any conditions.

Agronomist Firman E. Bear points out that "if a soluble phosphate is applied to acid soil, it loses its solubility almost immediately."

In our typical acid soils the highly-soluble phosphates are soon fixed in the soil by iron and aluminum to form compounds from which crops can get little or no phosphorus plant food. Ammoniated superphosphate in mixed fertilizers, however, has the phosphorus tied to calcium, so it is less apt to be tied up with iron or aluminum.

Agronomist Louis Thompson of Iowa State College says, "Phosphorus combined with calcium is more soluble than if combined with iron or aluminum."

That is why fertilizers containing ammoniated superphosphate have an advantage over fertilizers containing more soluble phosphorus in soils having high fixation properties.

Agronomist C. E. Miller of Michigan State College points out, "when water-soluble phosphates are added to the soil, rapid fixation occurs. It is rather generally assumed that liming is a valuable practice in liberation of fixed phosphorus and in prolonging the availability of applied phosphates in acid soils."

It will pay you to encourage farmers to test their soils regularly and apply lime or limestone as needed.

Lime provides the calcium to reduce soil acidity, so that less soluble iron and aluminum are present in the soil solution to tie up phosphorus. Most forms of phosphorus perform best when acid soils are limed enough to reduce acidity to a pH of 6 to 7. Since leaching and crop use of calcium may take 250 or more pounds of calcium out of the soil every year, it pays farmers to have a regular program of liming at least once during a crop rotation.

Many field tests have shown that liming soil has improved crop returns on corn and grain as much as $4 to $5 per acre. In a 5-year Ohio test with a corn, wheat and hay rotation, investment of $1.35 in lime per year per acre produced extra crops worth $14.78 in a clover rotation and $23.03 in an alfalfa rotation.

Apply Lime Any Time

Spreading limestone with dealer trucks during off-days and slow seasons is a good way to help your fertilizers pay off for farmers. Legumes need lime in the surface soil at seeding time. But for other crops, lime can be applied at any time before or after plowing. Fall is a good season for liming stubble ground and pastures. Your fertilizer will show better profits on limed land. When you sell fertilizer—don't forget lime!

NITROGEN *plus* SERVICE

There are many reasons why it pays you to deal with Nitrogen Division, Allied Chemical. You are served by America's leading producer of the most complete line of nitrogen products. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions for the fertilizer industry. You are assured of dependable supplies from three huge plants at Hopewell, Ironton, and Omaha. Your nitrogen is delivered to you by the best transportation facilities and equipment. You get technical assistance and formulation advice from the largest and most efficient staff of nitrogen experts. Your sales are supported by the most powerful advertising campaign ever conducted to sell fertilizers. Nitrogen Division is your headquarters for NITROGEN *plus* SERVICE. Look over the big line and contact one of the 14 offices listed below.

Arcadian® Nitrogen Solutions

	CHEMICAL COMPOSITION %					PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®								
2	41.0	22.2	65.0	—	12.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	1.147	18	26
3	41.0	26.3	55.5	—	18.2	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	1.188	1	56
4M	41.0	19.0	72.5	—	8.5	1.194	7	61
6	49.0	34.0	60.0	—	6.0	1.052	48	-52
7	45.0	25.3	69.2	—	5.5	1.134	22	1
URANA®								
10	44.4	24.5	56.0	10.0	9.5	1.108	22	-15
11	41.0	19.0	58.0	11.0	12.0	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	1.081	25	- 7
13	49.0	33.0	45.1	13.0	8.9	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	1.052	29	1
U-A-S®								
A	45.4	36.8	—	32.5	30.7	0.925	57	16
B	45.3	30.6	—	43.1	26.3	0.972	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	0.618	211	—

Other ARCADIAN® Nitrogen Products: UREA 45 • A-N-L® Nitrogen Fertilizer
Ammonium Nitrate • American Nitrate of Soda • Sulphate of Ammonia

NITROGEN DIVISION Allied Chemical & Dye Corporation

MAIN OFFICE: 40 Rector Street, New York 6, N.Y., Phone: Hanover 2-7300

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Hopewell, Va., P. O. Drawer 131	Cedar 9-6301
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Omaha 7, Neb., P. O. Box 166	Bellevue 1464
Raleigh, N. C., 16 W. Martin St.	Temple 3-2801
Columbia 1, S. C., 1203 Gervais St.	Columbia 3-6676
Atlanta 3, Ga., 127 Peachtree St., N. E.	Jackson 2-7805
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Los Angeles 5, Cal., 2999 West 6th St.	Dunkirk 8-3201
San Francisco 4, Cal., 235 Montgomery St.	Yukon 2-6840

NPFI Sets Up Purdue Research

The National Plant Food Institute has entered into an agreement with Purdue University to establish a research grant at the University's Agricultural Experiment Station with the Department of Agricultural Economics, "for the purpose of supporting a program of research covering the economics of fertilizer use in crop production with special emphasis on economics of fertilizer use in crop production with special emphasis on economic analysis of agronomic data," Dr. Russell Coleman, executive vice president of the institute, has announced.

The one year grant of $2,100 authorized by the Institute will permit the University personnel to assign qualified staff members to direct the graduate students and to supervise the project, including the necessary field, laboratory, and greenhouse facilities.

Dr. Coleman said that "more and more the need has become apparent for a stepped-up program in the field of fertilizer economics, particularly the economic analysis of agricultural data."

"Fertilizers perform two great services for farmers," said Dr. Coleman. "They conserve and build up the soil and they add greatly to the income of the users. We need more precise information on the effect of various fertilizer practices on increasing individual farmers' incomes."

S. C. PFES Annual Meeting

The 8th annual meeting of the South Carolina Plant Food Educational Society was held September 25, and as we went to press the program included these speakers: Dr. R. F. Poole, Clemson President; Hugh Woodle, Clemson agronomist on the corn contest; Clemson's Robert H. Garrison on small grain plantings; conservation engineer J. T. McAllister on stubble mulch planting; NPFI's Dr. W. H. Garman on the Institute's expanded fertilizer use program; Dr. J. F. Reed, American Potash Institute, on fertilizer placement; a tour of fertilizer department facilities conducted by Dr. Bruce Cloaninger; a banquet talk by Dr. George Kind, Georgia AES director—and a review of NPFI's "What's in the Bag" color film.

Fertility or Futility?

Are we really "Responsible for most of our own troubles" . . . as T. D. Dunscombe says here?

by T. D. Dunscombe
Columbia, Missouri

The chemical plant food industry represents the greatest advance in human values the world has ever known.

This I Believe.

For the first time in the history of mankind there is the possibility that man, collectively, may go to bed with a full belly; holding the promise that we may be on the threshold of winning the battle against that sinister horseman—Famine. And, if we can win the age-old struggle against famine, we shall have gone far in our fight against the other three: War—Pestilence—Death.

Yet, it seems some of our actions, and practices, are such as to suggest we are intent upon committing hari-kari by the quickest and most direct route.

We are, all of us, responsible for most of our own troubles. The plant food industry is no exception. A hair letting-down session might highlight the following as among our most troublesome ills: Element-oxide feud; too many agents; consignment sales; trucker agents; price-cutting; lack of salesmanship; and, more recently, the manufacturer who sells straight materials for little, if any, margin; under the delusion this will get him additional mixed goods business.

First off, we have this hybrid ratio designation that has been in existence for a great many years. Currently, after smouldering for the past decade, the fish-fowl vs. purists battle is, at least, a noisy one. Those who want to continue the oxide basis for phosphate and potash advance very convincing arguments for their position; and those who wish to change to an elemental basis are just as adamant that a change is long overdue. The "as-isers" point out that fertilizer laws of a great many states will need to be changed (no small job); and that a most intensive educational campaign will be necessary to acquaint all groups, particularly farmers, with the change. More generally, they say; "Why not leave well enough alone? We are having enough trouble trying to sell our production, without cluttering up the farmer's mind with doubts and suspicions."

Proponents of change offer as reasons for making the change: uniformity, accuracy, simplification, elimination of confusion, and an increase in the use of fertilizers. For the sake of uniformity, accuracy, and simplicity the change would seem to be desirable. Instead of eliminating confusion, it is more likely a change will really cause confusion. Who is confused? Not the farmer who buys the fertilizer; nor the agent who supplies the farmer. The existing method is all they know, so how could they be confused. As to confusion within professional circles, it is purely academic, and they should have learned long since that it is far better for the technicians in the background to be confused than it is for the paying customers.

It seems rather naive to presume that fertilizer sales will be increased by the simple expedient of changing from an oxide to an elemental guarantee. There is a continuous flow of information from the colleges and industry, pointing out that fertilizer reduces production unit costs, and improves quality of product. Proof of the value of fertilizers exists, literally by the ton; and new evidence is added every growing season. The wide gap between recommendation and practice is not due to lack of information, or lack of proof that fertilizer is the ONE production item that most often makes the difference between profit and loss. I cannot see much probability of increasing over-all sales of fertilizers until, and unless, we develop the potential that exists in pastures and timberland. Some of the newer nitrogen products are enjoying very nice increases in tonnage, but these gains are at the expense of older materials.

Regardless of the intensity of the effort to educate farmers to the change from oxide to element, or how long the campaign before the change takes place, it is seriously doubted if ten per cent of the fertilizer customers will really 'get' the message. If every rural newspaper, and every farm magazine in every issue for a year; and every radio and TV station explained it every day for a year, the majority of farmers would have to be told, and sold, at the point of sale—by the local fertilizer agent and his employees.

Suppose we use 3-12-12 as an example. The present retail price of 3-12-12 is around $50/ton. If changed to an elemental basis, the analysis would be 3-5-10, in even numbers. It will be extremely difficult to make a great many farmers understand why they should pay the same price for a 3-5-10 that they paid recently for a 3-12-12. On an elemental basis a 3-12-12 should sell for about $75-$80/ton. Likewise, it would be interesting to listen to an agent explaining to a skeptical farmer why he should pay at least fifty per cent more for 3-12-12 than he did just a short time ago. If there is the feeling that I am making a mountain out of a mole hill, suppose the reader 'poll' a few of his agents. He will most likely find

that few of them even know that fertilizer guarantees could be expressed any differently than they are; that it will take quite a bit of explaining before most of them understand the difference between the element and the oxide; and that all will be reluctant to assume the responsibility of 'selling' it to the customers. As one agent told me, "I hope I never have to try to explain it to my customers."

To warp an old aphorism, it would seem better to let lying dogs sleep.

We have grain elevators, farm supply stores, general merchants, grocery stores, hardware stores, cotton gins, feed stores, vocational agriculture teachers, real estate dealers, gas service stations, drug stores, supermarkets, liquor stores, truckers, and possibly others, all handling fertilizer. By and large real selling effort is non-existent. Fertilizer is a sideline that is likely to remain such under existing methods of distribution, because an accumulation of poor merchandising practices has just about squeezed out the profit—not only for the agent, it amounts to is that he is swapping his warehouse space, and his own credit sales against the cost of the goods handled.

Some manufacturers are said to make agents of any trucker who drives up with enough money to pay for a truck load of fertilizer. It seems to be true that there are quite a few truckers who are agents for fertilizer; a majority of whom will deliver fertilizer to a customer's farm for little more than the 'Agency Cost'; being satisfied with the mite that is left over from the hauling allowance, after paying out of pocket expense. Most people with whom I have talked consider 'Black-Haul Billy' public enemy number 1 of the industry.

Equally lacking in vision, say some, is the manufacturer who thinks he will get a larger tonnage of mixed goods business by the simple expedient of handling straight materials for a margin so small it won't even pay its own service cost. It would seem more likely he is only hastening his own demise as a fertilizer manufacturer.

The author of this challenging article told us his first thought was to title it "This crazy, mixed-up fertilizer industry" but thought better of it. Perhaps you will agree with him; perhaps take violent issue. Anyhow, read it and see.

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but the manufacturer as well.

There is no incentive for anyone to become a dealer in mixed fertilizers, because there simply must be a profit possibility in any product for its distribution to be attractive to a potential dealer.

Conditions have become so chaotic in some localities that manufacturers are selling direct to consumers. Some basic suppliers are thoughtfully reviewing their own sales policies since they are being called upon to carry more and more of the financial load; in the form of receivables, delayed billing, etc. We see reports that some producers of basic materials are setting-up pilot plants for the manufacture of granular fertilizers, as an additional technical service to their customers. We see other reports indicating some basic producers are considering their own mixed fertilizer plants. Could these two straws be blowing in the same wind?

Putting merchandise out on consignment doesn't stimulate sales effort. It may be justified because it makes it possible for an agent to stock a greater variety, a larger tonnage, or both, than he could handle with his own resources. About what

Another practice that makes one wonder is that of selling granular fertilizers for the same price as meal-type. By comparison, granular fertilizer is a quality product that is being demanded more, and more each season. The cost of a granulating plant is certainly much greater than one to make meal-type fertilizer, therefore a higher depreciation cost/ton as well as a higher manufacturing cost/ton. By any manner of figuring, or any comparison one cares to make, granular fertilizers should sell for more than meal-type.

Are we going overboard in our efforts toward higher and higher analyses? Will it cost more in the long run to replace the elements that are now being refined out of our higher analysis goods? We see more comments about so called 'minor element' deficiencies than we did some time ago. It may be that we are just now developing the know-how to recognize their lack; or that they are not so minor after all. I don't like the use of this word "minor" in connection with plant foods any way. It implies that the lack of certain elements is a matter of indifference.

Probably the most vicious ill that plagues our industry is this perennial price-cutting. It seems to have become endemic. The tragedy is that price is not the most important reason farmers themselves give for buying fertilizer. In one state-wide survey farmers gave the following reasons, listed in the order of their importance: (1) Quality, (2) Convenience, (3) Brand preference, (4) Price, (5) Personal friendship, (6) Service, (7) Dealer or relative of dealer, (8) Better credit, (9) Rents from dealer, (10) Bulk service, (11) Regular supplier did not have desired grade.

By and large our cardinal sin is lack of salesmanship. The basic producer expects the manufacturer and the colleges to do the selling. The manufacturer expects the agent to do the selling. Too many times the agent has too many irons in the fire to do a real selling job on fertilizer, or anything else. So . . . he thinks he will get a satisfactory volume by price cutting; or along comes 'Black-Haul Billy' who effectively demoralizes the whole area, with his "I'll sell it to you at cost."

There just aren't enough men out asking for the business, at the retail level; and there aren't enough men in the stores who have the time, the training, or the inclination, to really sell those who do come in. More often, the farmer sells the agent on the idea that "he can get it cheaper at Joe's." There isn't enough advertising. A review of five current farm magazines revealed only one fertilizer advertisement. This one was a one-inch by one-column ad in the classified section, which offered to convert enough sawdust into fertilizer for one-eighth acre at the small price of $6.95. Every conceivable kind of farm production item was offered for sale, **but** the one that has the lowest relative cost, and, without which, the others aren't of much value. In the survey previously mentioned farmers listed four sources of information that prompted their purchases of fertilizer. They were (1) Farm magazines, (2) Soil tests, (3) County Agents, (4) Their own experience.

It is probable there will be some very drastic changes before we see any permanent betterment; and it is not likely these changes will be of benefit to the large, centrally located, conventional plant that manufactures a pre-determined number of grades of granular and/or pulverized fertilizers.

farms must grow larger

and become better fertilizer customers

A few years ago we ran an editorial in these pages which expressed the belief that the small farmer, being marginal, must give way to the big, business-managed, mechanized farm. We were not alone in this opinion, but many of those who knew the facts and recognized their import were hampered by the political aspects of preaching big business.

Even if there were no supporting data for this, plain logic argues that an efficiently run farm, well-financed, well-equipped, can survive while the small one or two-man farm goes under in the press of economic changes.

And it seems obvious that the future of the race depends on farms that can keep pace with the boom in people which even now is with us. In the 40's and 50's we bred this boom in people. Today we have 171,000,000 people in the U.S. 25 years from now they figure we will have 250,000,000. So there is a rising market of mouths to feed, and little, if any, added land on which to grow the food.

Which spells the need for making every acre do a bigger and better job than has been true in the past.

As Assistant Secretary of Agriculture Butz pointed out in a talk some time ago, "Since the turn of the century there has been no significant change in the total acreage harvested. "However, the productivity of this land has been increased by higher yields and more efficient methods. Quality of our farm products has also been improved through extensive breeding work and the development of better cultural, harvesting and processing practices."

In that same talk Mr. Butz said "With an increasing investment in machinery and equipment, the individual farm has had to grow larger to provide a producing unit that would permit efficient utilization of this mechanical equipment . . . "

This is a debatable point; which came first, the chicken or the egg? But makes little difference. The main point is that the machine makes it possible now for the same acreage to support a population that has nearly doubled in 50 years, and the machines and methods of the future will feed the 46% more people we expect in the next quarter century.

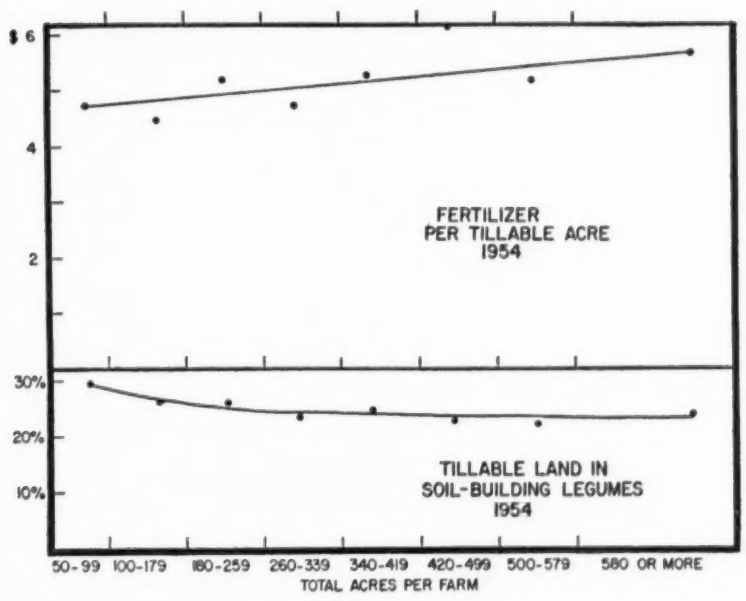
This amazing performance has largely taken place in the last 25 years. It parallels, though it does not equal, the miracles of industrial development in the same period. It must catch up,—and it will. Because farming is coming to be measured by brainpower, rather than mulepower.

Wars are credited with this development of agriculture just as wars forced so much technical progress. And war is credited with the boom in people, which will force the next great steps in farming.

The subject is being given much serious study. We find in our current material, for example, two valid studies of the changes in commercial farming. One of them was published in "Farm Research," organ of the New York AES, and written by L. C. Cunningham of the Ithica Department of Agricultural Economics. The other is an elaborate report entitled "Farms are Growing Larger," written by Illinois' Professor Emeritus M. L. Mosher. Both run along the same lines, showing the efficiency which has brought about the change from the small to the large farm. For the most part this latter report is based on the findings of farm records kept by northern Illinois farmers, plus Professor Mosher's observations during 50 years of agricultural extension work in Illinois and Iowa.

As Hadley Read points out in his letter transmitting this work to us, there is special interest in this quote from the book: "If northern Illinois farms continue to grow larger at the accelerated rate of the past 30 years, commercial farms on which there is no outside income will be absorbed into larger farms with the passing of this generation of farmers." *(Concluded on page 28)*

BIGGER FARMS PLANT LESS LEGUMES, USE MORE FERTILIZER
(from M. L. Mosher's "Farms are Growing Larger")



Farm Growth

(Continued from page 27)

Dr. Mosher's "Table 1" below actually pinpoints the trends of variable factors in relation to the size of the farm, but a few quotes selected from different sections of his booklet highlight the findings of this study:

"The efficiencies due to larger size of farms appeared to level off at about 260 acres" and farmers who increased size of their farms were on the average more efficient operators during the first part of the period, but lost some of their advantage in efficiency after further increases.

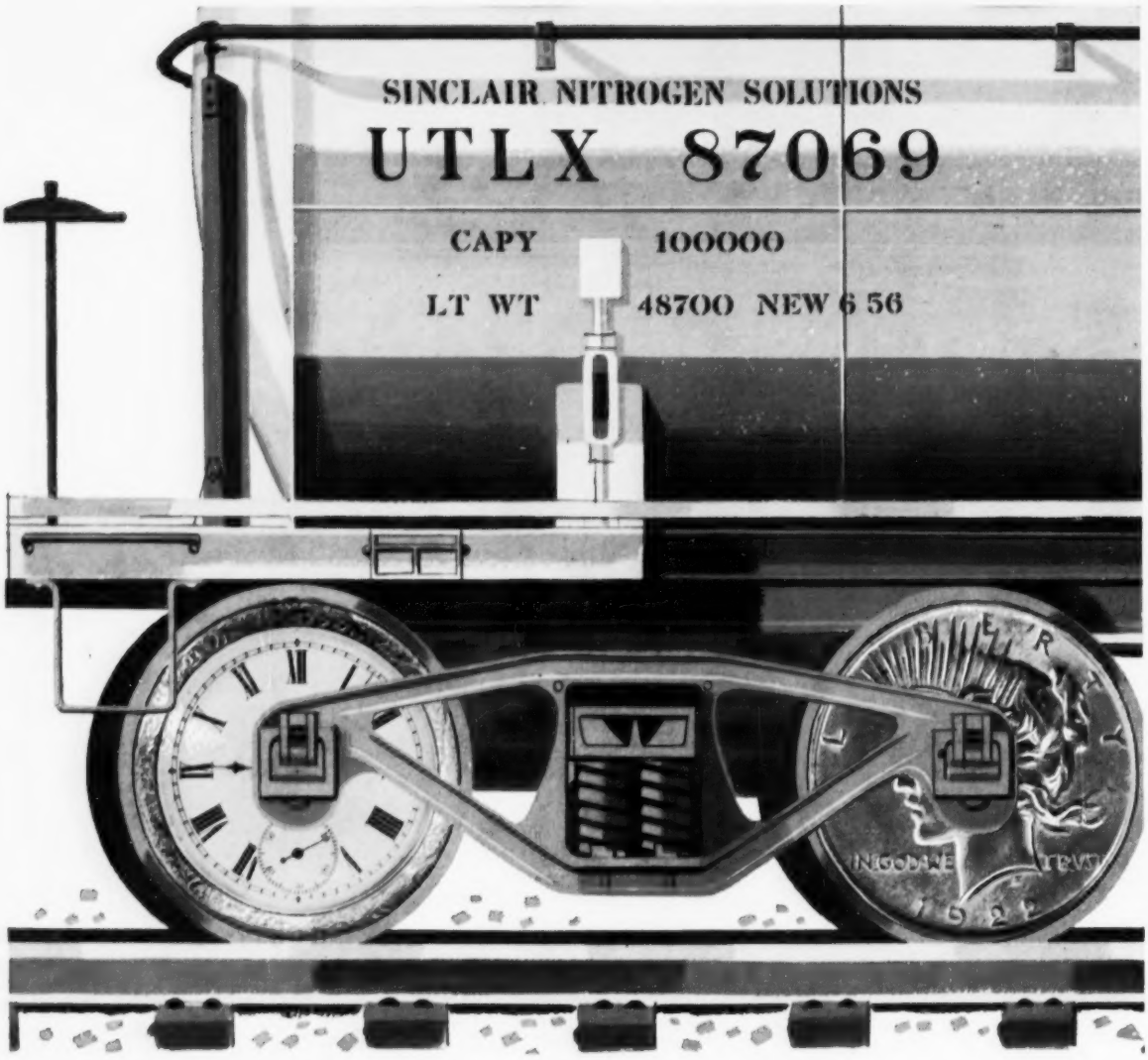
"The optimum use of land, labor and capital was found on farms of 260 to 339 acres" . . . but "more families having earnings of $7000 to $15,000 in 1954 were found in the county-equivalent area of farms of 180 to 259 acres than in any other size-of-farm area."

Nevertheless, Dr. Mosher concluded that "the two-man size of farm business is desirable, since it provides for the continuity of family ownership of farms or for continuity of operation of rented farms."

Table 1—Basic Information Regarding Earnings on Farms of Different Sizes (Northern Illinois, 1954)

	Size-groups of farms—total acres per farm							
	50 to 99	100 to 179	180 to 259	260 to 339	340 to 419	420 to 499	500 to 579	580 or more
Number of farms in sample	50	50	50	50	50	50	50	50
Average size of farms, acres	81	152	221	295	374	453	539	701
Average percent tillable	88	90	91	91	89	88	87	89
Average soil rating	78	81	81	81	80	80	80	79
Men per farm	1.1	1.3	1.4	1.7	2.1	2.4	2.5	3.2
Total investment per farm	$41,146	$72,553	$101,481	$130,839	$167,959	$194,920	$230,567	$293,139
Investment per man	37,405	55,810	72,486	76,964	79,980	81,216	92,227	91,606
Investment per acre	507	478	459	443	449	430	427	418
Farm returns								
Crop sales above feed purchases		$ 2,899	$ 3,352	$ 6,608	$ 8,492	$ 11,964	$ 17,328	$ 21,064
Hog returns	$ 2,841	6,118	8,170	12,380	13,675	12,302	11,338	13,747
Dairy sales	1,791	1,471	1,015	928	536	575	619	356
Cattle returns	1,336	1,437	4,901	4,135	7,597	11,766	9,250	16,425
Sheep returns	45	197	80	110	327	319	553	243
Poultry returns	1,445	594	859	575	535	577	258	174
Miscellaneous	361	314	475	604	681	832	1,183	1,259
Gross farm returns	$ 7,819	$13,030	$ 18,852	$ 25,340	$ 31,843	$ 38,335	$ 40,529	$ 53,268
Farm operating costs								
Feed cost above crop sales	$ 439							
Soil fertility	337	$ 617	$ 1,060	$ 1,286	$ 1,781	$ 2,513	$ 2,459	$ 3,550
Buildings and fences	722	926	1,271	1,359	1,955	2,239	2,562	2,862
Machinery and equipment	2,344	3,132	4,077	4,826	6,448	7,220	7,731	10,144
Labor, paid and unpaid	2,253	2,752	2,927	3,785	4,777	5,620	5,888	7,385
Taxes (not income tax)	423	696	908	1,249	1,465	1,749	1,998	2,760
Seed and crop expense	222	445	692	775	1,020	1,261	1,379	1,685
Miscellaneous	345	431	431	593	799	819	874	795
Total operating costs	$ 7,085	$ 8,999	$ 11,366	$ 13,873	$ 18,245	$ 21,421	$ 22,891	$ 29,181
Returns for capital and management	$ 734	$ 4,031	$ 7,486	$ 11,467	$ 13,598	$ 16,914	$ 17,638	$ 24,087
Labor costs								
Hired labor	$ 128	$ 440	$ 722	$ 1,408	$ 2,206	$ 2,968	$ 3,067	$ 4,319
Unpaid family labor	214	345	252	304	510	618	777	994
Operator's labor	1,911	1,967	1,953	2,073	2,061	2,034	2,044	2,072
Total labor cost	$ 2,253	$ 2,752	$ 2,927	$ 3,785	$ 4,777	$ 5,620	$ 5,888	$ 7,385
Interest on capital	1,822	3,169	4,406	5,659	7,292	8,437	9,955	12,642
Charge for management (7 percent of gross farm returns)	547	912	1,320	1,774	2,229	2,683	2,837	3,729
Returns for labor, capital, and management[1]	$ 2,987	$ 6,783	$ 10,426	$ 15,252	$ 18,375	$ 22,534	$ 23,526	$ 31,472
Returns for labor[2]	618	2,702	4,700	7,819	8,854	11,414	10,734	15,101
Labor returns per man	589	2,078	3,357	4,600	4,216	4,756	4,294	4,720
Farm and family earnings[3]	2,859	6,342	9,704	13,844	16,169	19,566	20,459	27,153
Operator's labor and management earnings[4]	823	2,829	5,046	7,881	8,367	10,511	9,727	13,517
Management returns[5]	—1,088	862	3,093	5,808	6,306	8,477	7,683	11,445
Returns for capital and management[6]	734	4,031	7,486	11,467	13,598	16,914	17,638	24,087
Net earnings per $100 investment (rate earned)[7]	1.78	5.54	7.39	8.76	8.10	8.68	7.65	8.22
Net earnings per acre[7]	9.05	26.47	33.89	38.82	36.39	37.31	32.73	34.36
Some efficiency factors								
Yield of corn, bushels per acre	77.8	72.9	72.4	73.4	74.1	71.1	67.7	71.3
Bushels of corn per tillable acre	31.5	31.6	29.6	31.8	30.6	30.7	29.0	29.4
Returns per $100 feed to hogs	$ 134	$ 153	$ 148	$ 147	$ 157	$ 151	$ 153	$ 141
Pigs weaned per litter	6.0	6.9	6.8	7.1	7.2	7.3	7.2	6.8
Pounds of hogs per tillable acre	219	238	219	242	215	161	124	120
Milk produced per cow	9,113	7,553	7,724	7,040	7,170	6,889	7,284	6,090
Eggs produced per hen	205	197	180	183	155	182	165	159
Labor cost per crop acre	$ 38.20	$ 23.67	$ 17.21	$ 16.64	$ 16.98	$ 15.97	$ 14.63	$ 14.03
Machinery cost per crop acre	39.76	26.94	24.07	21.22	22.92	20.52	19.22	19.28
Buildings and fences cost per acre	8.90	6.11	5.73	4.60	5.23	4.94	4.75	4.08

[1] Returns for capital and management plus total labor cost.
[2] Returns for labor, capital, and management less interest on capital and charge for management.
[3] Returns for unpaid labor, capital, and management.
[4] Returns for labor, capital, and management less hired and family labor and interest on investment.
[5] Operator's labor and management earnings less operator's labor.
[6] Returns for labor, capital, and management less total labor cost.
[7] Refers to returns to capital and management.



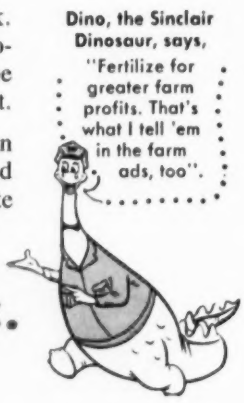
How Rapid Delivery of Sinclair Nitrogen Products

CAN SAVE YOU TIME AND MONEY

Rapid—on-time—delivery to your plant is an important reason why you should order nitrogen supplies from Sinclair. It can make the difference between filling an order at a profit or losing a sale and customer good will.

A big, new nitrogen plant at Hammond, Indiana, is in the center of the nation's rail and truck transportation network. Large storage facilities in this key location mean that your order can be filled for fast delivery when you need it.

For fast, low-cost delivery of nitrogen solutions, anhydrous ammonia and aqua ammonia call on Sinclair. Write or phone . . .



SINCLAIR CHEMICALS, INC.

(Affiliate of Sinclair Refining Company)

600 Fifth Avenue, New York 20, N. Y. – Phone Circle 6-3600
155 North Wacker Drive, Chicago 6, Illinois – Phone Financial 6-5900

MARKETS

ORGANICS: The market on Organic Ammoniates for fertilizer use is in good balance with several producers of Nitrogenous Tankage well sold on supplies for the balance of 1957. Prices range from $3.00 to $4.00 per unit Ammonia October through December and $3.25/4.25 January/forward depending on shipping point.

SEWAGE SLUDGE: Current price of one major producer is $2.60 per unit of Ammonia and 50¢ per unit of APA bulk f.o.b. Midwest production point, with expected rise of 50¢ per unit of Ammonia for October/forward shipment. Another production is quoted at $2.75 per unit of Nitrogen and 50¢ per unit of APA bulk f.o.b. Southwest production point for the entire season.

CASTOR POMACE: A limited quantity for the last half October through December shipment has been offered at $45.50 per ton in bags f.o.b. Central Eastern seaboard shipping point. Production continues on a limited scale.

DRIED BLOOD: Unground, sacked Blood is indicated at around $5.00 per unit of Ammonia f.o.b. New York area and around $6.00/6.25 in Chicago area.

POTASH: Demand continues in seasonal dimensions with prices f.o.b. production point unchanged from previous contract schedules. Delivered cost is slightly higher on account of increased freights.

GROUND COTTON BUR ASH: Demand continues steady for this form of Potash testing 38/40% K_2O, approximately 70% in the form of Carbonate of Potash. Use is for specialty crops primarily, such as gladioli, tobacco, vegetables, citrus etc. and delivered cost approximates that of Sulphate of Potash.

SUPERPHOSPHATE: Production during the summer months was considerably less than in the same period of the previous year and stocks are lower with prices firm and slightly higher than last season.

PHOSPHATE ROCK: Supply position is comfortable and movement is entirely seasonal. Prices are steady.

CALCIUM AMMONIUM NITRATE: Demand continues at low seasonal levels and prices the same as prevailed during the previous season. No indications have been made as to any change in price for the new season.

AMMONIUM NITRATE: A number of large producers have announced that effective October 1 the price f.o.b. shipping point in bags will advance $4.00 per ton for the period October through December and another $4.00 per ton for the period January through June, making the October/December period $68.00 and January/forward $72.00.

GENERAL: Recent increases in freight rates have brought about increased delivered cost and in some instances such as Ammonium Nitrate increased f.o.b. production point prices. Fertilizer manufacturers are generally quite concerned with the problem of getting better prices for their finished products in view of the increased cost of producing mixed fertilizers.

INDUSTRY CALENDAR

Date	Organization	Place	City
Oct. 3-5	Pacific N.W. Plant Food	Challenger Inn	Sun Valley, Ida.
Oct. 17	Chem. Control Procedures	Shoreham Hotel	Washington, D.C.
Oct. 17-18	Control Officials Assn.	Shoreham Hotel	Washington, D.C.
Oct. 21-22	Fertilizer Safety Section	La Salle Hotel	Chicago, Ill.
Oct. 31	Southern Fert. Conf.	Dinkler Plaza	Atlanta, Ga.
Nov. 1	Sou. Soil Fertility Conf.	Dinkler Plaza	Atlanta, Ga.
Nov. 3-5	Calif. Fert. Assn.	St. Francis Hotel	San Francisco
Nov. 6-8	Fert. Indus. Round Table	Sheraton Park	Washington, D.C.
Nov. 17-19	Nat'l Fert. Solutions Assn.	Netherland-Hilton	Cincinnati, Ohio
Nov. 18-22	Amer. Soc. Agronomy	Atlanta Biltmore	Atlanta, Ga.
Dec. 11-13	Ag. Ammonia Inst.	Marion Hotel	Little Rock, Ark.
	1958		
Jan. 7-8	Texas Fert. Conf.	Memorial Center	College Station
Feb. 13-14	MidWest Soil Impr.	Edgewater Beach	Chicago, Ill.

CF Staff-Tabulated TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by Cooperating State Control Officials and Tabulated by COMMERCIAL FERTILIZER Staff

STATE	August 1957	August 1956	July 1957	July 1956	Apr.-June Qtr. 1957	Apr.-June Qtr. 1956	Jan-Mar. Qtr. 1957	Jan-Mar. Qtr. 1956	July-December 1956	July-December 1955	YEAR (July-June) 1956-57	YEAR (July-June) 1955-56
Alabama	.....	21,546[1]	17,153	16,468	517,785	524,594	291,118	347,956	174,707	165,867	983,607	1,042,416
Arkansas	.....	7,635[1]	20,457	11,869	144,366	157,191	120,899	141,981	59,915	60,299	325,150	359,471
Georgia	21,814	19,487	60,490	46,437	759,449	771,592	221,375	216,862	253,559	250,968	1,234,383	1,244,422
Kentucky	.....	12,294[1]	.....	5,336[1]	277,233	273,110	173,850	168,371	90,284	91,478	541,367	529,600
Louisiana	9,676	5,974	11,459	7,852	117,568	120,874	82,709	93,469	71,129	59,345	271,406	273,688
Missouri	.....	56,557[1]	26,013	26,842	240,798	208,976	219,689	235,254	331,343	356,241	791,830	800,471
N. Carolina	.....	21,024[1]	12,999	14,968	765,579	742,370	534,774	581,897	216,234	225,182	1,516,587	1,649,449
Oklahoma	.....	9,946[1]	4,351	3,396	24,968	33,970	27,868	31,884	54,509	69,542	107,345	135,396
S. Carolina	13,416	11,911	11,248	12,764	102,001	121,586	393,741	452,619	122,929	119,947	817,500	863,617
Tennessee	16,229	12,559	18,506	24,536	334,808	327,890	48,649	50,736	165,796	154,260	549,253	532,886
Texas	22,333	14,458	44,039	24,199	187,223	191,893	205,547	180,802	202,406	193,704	595,176	566,399
California	(reports compiled quarterly)				399,214	358,524	264,270	280,853	412,747	361,615	1,076,231	1,001,554
Virginia	(reports compiled quarterly)				323,024	325,469	277,124	273,642	154,075	162,709	754,223	761,820
Indiana**	(reports compiled semi-annually)								305,917	255,131	1,087,185	1,063,049
Iowa	(reports compiled semi-annually)								85,147	130,000	.....	445,329[1]
Michigan	(reports compiled semi-annually)								184,763[1]	*	.....	*
New Hampshire***	(reports compiled semi-annually)								3,253[1]	*	18,983[1]	*
Washington	(reports compiled semi-annually)								55,709	48,749	.....	152,674[1]
Connecticut	(report issued annually)										.....	76,660[1]
Oregon	(report issued annually)								62,147[1]	*	.....	*
TOTAL	83,468	64,389	226,715	189,331	4,194,016	4,158,039	2,861,613	3,056,326	2,756,406	2,705,037	10,651,243	10,824,238

.....(not yet reported) * Not compiled [1] Omitted from column total to allow comparison with some period of current year.

**Tonnage reported January-June, 1957: 781,268 tons versus 807,981 tons for same 1956 period.
***Tonnage reported January-June, 1957: 15,730 tons versus 13,168 tons for same 1956 period.

belt feeders

HEART OF NEW RED STAR SYSTEM

control product analysis

Accurate control of pelleted fertilizer analyses along with lower production costs and increased plant capacity has been accomplished by the completion of a modernization program at the Red Star Fertilizer Company plant, Sulphur Springs, Texas.

Heart of the new processing system at Red Star, a division of the Southern Farm Supply Association, are four belt feeders. These Omega Model 37-20 Hi-Weigh Belt Gravimetric Feeders accurately control flow of dry fertilizer materials and deliver pre-determined formulas of raw materials onto a common conveyor belt where primary mixing takes place.

"This continuous flow system increases our plant capacity to 18 tons an hour as compared to 12 tons an hour previously and eliminates the slow, costly batching procedure wherein materials must be individually weighed and then premixed before being fed into the ammoniator," said Archie T. Edwards, general manager.

Red Star, whose fertilizers are merchandised under the trade name "Super-Flo," is one of the most modern fertilizer manufacturing plants in Texas. The plant was purchased by Southern Farm Supply Association in 1948. An immediate modernization program was started at that time, changing the plant processing facilities from a pulverant product into a modern pelletized product plant. Following this changeover came the latest modernization program which included the Omega Gravimetric Feeders.

Archie Edwards says the program is another step in Red Star's aggressive desire to keep pace with modern manufacturing methods and produce the highest quality product possible.

Hough Payloaders transport materials from storage bins to receiving hoppers, from which they are elevated to bins and then fed into the Omega feeders for weighing and primary mixing. The four feeders, which have stainless parts at all points where the fertilizer flow is in contact with the machine, deliver the dry ingredients onto a collector belt at any desired rate up to 3,000 pounds a minute each over a 100-1 range.

The belt carries its load over a weigh platform, and as density changes occur in the material, sensitive scales signal a "Sens-A-Gram" gate controller which varies the gate opening to accommodate the new density. Each stream of dry material, therefore, is accurately weighed before it is elevated to a pug mill ammoniator where nitrogen solution and acid are introduced and the blend thoroughly homogenized.

"Close control of fertilizer formulation to meet state requirements for plant nutrients is afforded by the Omega installation because of its continuous accuracy," Edwards said.

Continuous mixing begins as soon as the feeders deliver the raw materials onto the conveying and elevating systems. Final mixing takes place in the pug mill ammoniator. Because the feeders assemble the materials continuously, there is no frequent starting or stopping of the conveyor, which eliminates a great

Dale Campbell, Red Star field service director, illustrates the equipment and materials he uses to put on dealer "fairs" at stores which handle "Super-Flo" fertilizers. Red Star provides dealers with a complete merchandising service which includes soil testing, educational material on the uses of fertilizers, films, printed brochures, pencils, matches and memo pads for handout to customers.

KEY TO PICTURES ▸

1. Box cars bringing in solid materials are unloaded by Payloaders, which dump the ingredients into an outside access grate for transportation by screw trough (foreground) to materials storage bins. Materials arriving in hopper-bottom cars are unloaded into a sub-receiving hopper and automatically fed into the screw conveyor.

2. Four Omega Model 37-20 Hi-Weigh Belt Gravimetric Feeders supplied by B-I-F Industries, Inc., comprise the heart of the new processing system recently completed at Red Star. The feeders accurately control the flow of dry fertilizer ingredients and deliver pre-determined formulas of raw materials for primary mixing.

3. Installation of this rotary dryer to develop intense heat for efficient control of drying and pelletizing was one of first modernization steps taken by Red Star. Photograph shows intake end with pug mill and primary pelletizer (top) discharging into furnace.

4. All switches controlling the processing machinery are centrally located on the second floor control panel adjacent to feeder installation where production controller can keep close tabs on the complete manufacturing process.

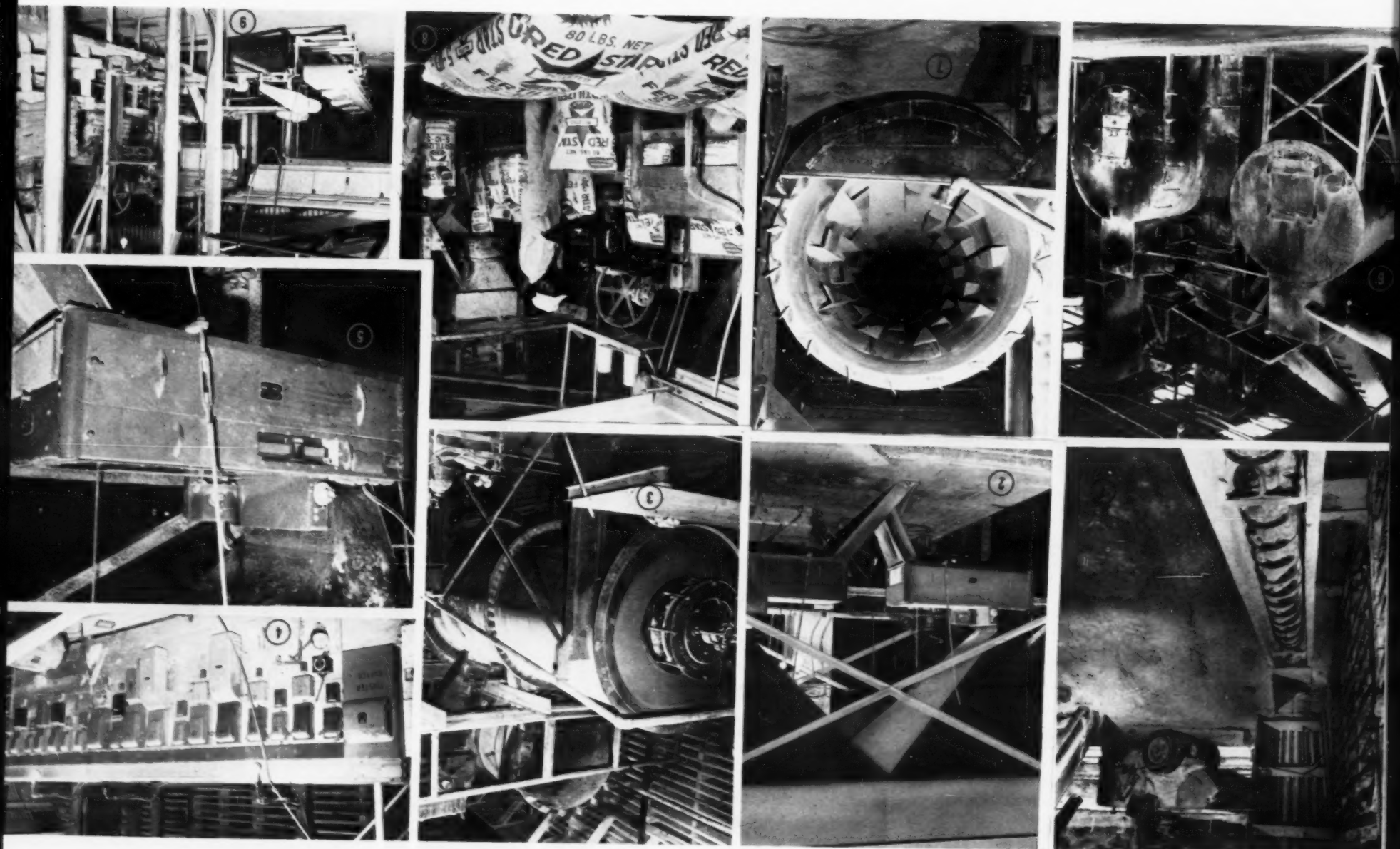
5. Close-up of Omega Belt Gravimetric Feeder shows sensitive scales which weigh the raw materials. As density changes occur in the material, the sensitive, accurate scales signal the gate controller which varies the gate opening to accommodate the new density, insuring accurate control of materials for primary mixing.

6. Two steel cylinders make up an integral part of the pelletizing process at Red Star. On the right stands the discharge end of the rotary drier from which the nearly-completed batch moves to the intake of the cooler (left) for finishing touches. Dust and moisture is driven off through the two flues projecting to the exterior of the building.

7. Discharge end of cooler shows near-even size consistency of pellets before screening. From here, final product is elevated to separation and sizing screens where fines are separated and re-cycled. Sized pellets are passed on to storage bins.

8. Sewing machine operator (above) feeds an average of 22 80-pound bags a minute through Red Star's bagging line. Maximum efficiency from the open-mouth bagging procedure was obtained through several unique adaptations to the standard equipment which were devised by Production Superintendent John Souter.

9. Customer truck loading has been simplified and streamlined for fast service so that several grades of fertilizer may be loaded on the same truck without appreciable delay.


80 LBS. NET
RED STAR

RED STAR

(Continued from Page 32)

amount of electric power required by the batch system.

In addition to their quality control features and their infinite flexibility over a 100-1 range, the feeders aid in inventory record keeping. Each one has a totalizer which records the amount of material it has weighed. The dust problem in the plant is also minimized, as each feeder is fully enclosed.

Red Star engineers worked with Longhorn Construction Company and engineers from Omega Machine Company, a division of B-I-F Industries, in setting up the gravimetric feeder system.

From the pug mill, the mixture goes into a primary pelletizer and then passes into a rotary furnace dryer where additional drying and pelletizing takes place. It is next carried to a cooler drum and then elevated and screened for distribution to bins with bookshelf-type dividers.

John Souter, Red Star production superintendent, has been responsible for many changes in plant procedures which have effected substantial savings in manufacturing and labor costs.

Under his direction, all fines are removed and recycled before storage. While removal of fines entails added cost, plant officials feel this is necessary to provide a dust free product ideal for airplane application. The use of a better grade potash has helped to cut the amount of recycling necessary.

John Souter has also stepped up the bagging efficiency to 400 tons in the average eight hour day. Using basic Inglett & Corley open-mouth bagging equipment and Union Special Sewing Machine, efficiency has been increased to 22 80-pound bags a minute through several innovations and changes in the original bagging and sewing machine equipment.

Customer truck loading has been simplified and streamlined for efficiency so that all trucks are loaded with dispatch, eliminating long waiting periods. Loading facilities are adaptable for loading various grades on the same truck without appreciable delay.

"Customer service is the key to our success and receives the undivided attention of all Red Star employees," Archie Edwards concludes.

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Three grades of muriate of potash designed to meet the needs of fertilizer manufacturers! USP's Higran, the new specially-sized white granular, and Higrade muriate (both containing 62/63% K_2O) — the purest agricultural muriates now available. And Granular muriate of potash, too, containing 60% K_2O. All three are non-caking and free flowing throughout.

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Flowers that Sell Fertilizer

THE GROCERY SUPERMARKET CAN BE YOUR "SCHOOL ROOM" FOR SMALL-PACKAGE VOLUME

We are told—and we think it is an educated guess—that something like 10% of fertilizer falls into the "specialty" class. A lot of this is in small packages—5 to 25 pounds for home use—but as much of it is also specialized grades suited to plants and soils with their own pH needs, it is hard to tell exactly how much is merchandisable through normal retail channels.

Whatever it is, the industry will have to agree that it is not enough.

We are in a period of growing leisure, and rapidly climbing wages. People who lived crowded in tenements, and barely had enough to eat a few years ago, are now owners or renters of homes with a plot of ground. And many of these have the yen to grow flowers, which seems to be an inherent characteristic of people generally. And those who were, in the past, moderately well-to-do are now tending to become two-home families, with plenty of opportunity and the facilities to really go in for floriculture in a big way.

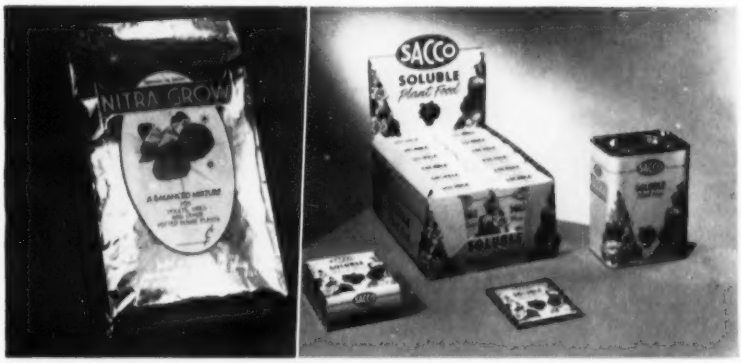
There are the people who know which are acid-loving plants, and which are not. They buy special plant foods for each of their pet varieties, just as the dog, the cat and the love-bird must each be fed its own particular diet.

Floriculture can be an absorbing hobby, and like all hobbies, can be a source of major profit to industries which serve them.

As most of us know from first hand experience, a hobby is an insidious thing. We start taking snapshots and wind up with a thousand dollars worth of equipment. Same with fishing, which begins with a bent pin, and runs into special fishing boats and clothes and a whole book full of flies of mystic importance.

Floriculture can sneak up on us the same way, and as it does, fertilizer can be a major part of the sales which result. As a matter of fact, it not only can be, but should be . . . and is, when properly merchandised.

Such merchandising starts, of course, with a choice of fertilizers suitable for small packaging or specialized purposes . . . and within the framework of the controls of the various states. This is obvious. But, apparently, not so obvious is the fact that the packaging is a vital part of success in this field. It must properly protect the plant food contents, —and contain them. It must be attractive. It must sell itself to the woman of the house—who is the major source of such volume.



Some modern small-unit plant food packaging. Foil-lined bag, left, has colorful flower illustration, a place for the merchant to write in the price—and full instructions on the back. The Sacco packages are a "family" with the same piece of artwork running through all the sizes and again detailed use instructions are on the back of each.

It must be remembered that we are dealing here with mass-merchandising retail stores. They do little or no selling; the goods must sell themselves. And if they do not, they are marked down and cleared out in a hurry. Each item of merchandise in a modern chain store must justify a carefully calculated revenue per square inch of shelf-space. And the packages are the final link that makes the sale as the woman goes down the aisle with her shopping bag or wheel-cart.

A moment ago we said the package must protect "and contain" the product. This is especially important in our case, because sifting of fertilizer just cannot be allowed in a retail food or drug store, no matter how innocent the sifted dust may be.

The package must be one that stands out from a distance and, like a highway poster, tells its story fast. You want the woman to stop. The package must stop her. If you are advertising to the consumer, the package must remind her of that advertising. If not, it must doubly do a job of selling.

You may feel you are too inexperienced in such packaging to design one to meet these specifications. And you may well be. But there are plenty of eager helpers, just waiting to be asked to work with you. They include the independent industrial designers and the very capable designers who work for suppliers of packages in the paper, wax paper, polyethylene and foil fields . . . any one of which may prove the answer to your merchandising package problem.

When you get to this point, your next step is to choose your merchandising channels. You are of course more familiar with the garden shops, the nurseries and such concerns, that stand half-way between the farm dealer and the supermarket. They have their following. In fact they are to the floriculture hobby what the sports-shop is to fishing, or the camera shop to the photo bug . . . when the hobby has really bitten deep, the hobbyist graduates from the supermarket to them.

You are doubtless quite unfamiliar with the operations of a supermarket. So you should be interested in the study made by the New Jersey AES. While their report does not go into the sale of plant foods, it does outline for you the results and procedures of setting up self-contained floriculture depart-

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Urea — Ammonia Solutions

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Urea — Ammonium Nitrate Solutions

Sohiogen 31, Sohiogen 32 — 28 and 32% nitrogen solutions containing no free ammonia

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Your choice of 45% N coated or 46% N uncoated, prilled urea supplemental source of nitrogen.

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SOHIO's complete line of nitrogen solutions opens new opportunities in formulation for fertilizer manufacturers . . . no other nitrogen producer offers a more complete line.

The broad selection of physical and chemical characteristics, total nitrogen content, and percentage of free ammonia in Sohio's solutions line means greater freedom in formulation . . . more flexibility in manufacture . . . and a better chance to cut your costs.

Sohio's technical service staff will be happy to help you select the exact solution that best fits your own needs . . . the one that produces best results at lowest cost.

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ments in supermarkets, based on actual performance in the field. As this report says, it is becoming big business. Fertilizer is the major item in a floriculture department. So it is worth your reading time, at least.

Chain Store Sales Of Horticultural Products

by GEORGE W. LUKE
Assistant Chairman,
New Jersey Agricultural Economics Dept.

Merchandising floricultural products in variety stores, food stores and mail order houses is becoming big business in the East, and there are several reasons for expecting it to increase greatly in the very near future.

(1) Chain store operators recognize the profitability of offering a wider variety of products, particularly non-food items.

(2) Floricultural products can be packaged and sold profitably in mass market outlets.

(3) Profit margins on floricultural products are larger than on most of the items now sold in chain stores.

(4) Mass market outlets offer excellent opportunities to reach a large volume of customers who cannot be reached through present marketing channels.

(5) Growers maintain that present markets are unable to handle the volume of output which they are producing and will produce in the future.

(6) More take-home pay enables consumers to buy more floricultural products.

For the last year research workers in the Agricultural Economics Department have been studying the marketing problems involved in retailing floricultural products in mass market outlets. Although preliminary results of the study revealed a considerable number of complex problems there is reason to believe that a great volume of floricultural products will be sold profitably through these new outlets.

Display Rack Installed

In September, 1955 a display rack with fluorescent lighting was installed in a medium-size food store in the New Brunswick area. The rack occupied 8 square feet of floor space and could hold 150 plants on three trays. It was stocked with a variety of foliage plants, African violets, potted mums and other plants as they came in season. Plants were labeled as to variety and price and the display was kept fresh by periodic watering and discarding of wilted material. Records were kept of sales and a consumer survey was made to determine consumer acceptance of this type of merchandising.

Decline in April

In a 12-month period in this pilot study, more than 2,000 plants were sold at an average mark-up of about 41 percent. About 75 percent of sales were in the eight months from August through March. There was a sharp decline in sales from April through July as local home-grown flowers began to affect the demand for potted plants.

Prices ranged from 19 cents to $1.19 per plant; the average price per plant for the 12-month period was 52 cents. Sales per square foot of floor space compared favorably with other novelty items in the store. The data indicate that flower sales follow the trend in sales of all items in food stores. Thursday, Friday and Saturday accounted for 78 percent of total sales during the week with Friday outstanding. A list of plants sold during the test period is as follows:

Philodendron, African Violet, Ivy, Cactus, Peperomia, Godseffiana, Chrysanthemum, Hahnii, Pothos, Snakeplant, Succulents, Tradescantia, Geranium, Coleus, Dishgarden, Nephthytis, Chinese Evergreen, Petunia, Salvia.

Wide Variety Offered

Although a wide variety of plants was offered in order to maintain an attractive display, philodendron consistently accounted for 25 percent of monthly volume. The margin on this type of plant, however, is small and other plants with larger margins should be stocked in addition to foliage plants. Profits are increased by these sales and sales of the ordinary foliage types are stimulated. Spring sales, for example, can be stimulated if trays of annuals for transplanting outside are available for the housewife. Marigolds, petunias and other annuals caused sales to increase despite the normal seasonal downtrend.

Discarded 5 Percent

The data indicate that waste can be kept to a minimum by ordering properly and by price discounts on plants that have been in the rack too long. In this study, losses from discarded plants amounted to about 5 percent of total volume. As a result it was not necessary to reduce prices often but there is evidence that customers react favorably to special sales of potted plants. The data also suggest that growers may have to revise their ideas of consumer demand and gear their production to what the consumer wants and not what the producer wants to sell. Factors that influenced sales in this study are listed below.

(1) **Attractive Display:** Housewives who are in a hurry will pass by unattractive flower displays. Colorful, well-arranged plants stimulated sales in this study.

(2) **Good Quality Plants:** Quality is as important in the sale of floricultural products as it is in the sale of fruits and vegetables. Poor quality is probably the principle ingredient in the destruction of repeat sales.

(3) **Location of Rack:** During the study the rack was moved to various places in the store with considerable effect on sales. Sales were greatest when the rack was close to the check-out counter and least when it was placed in inaccessible areas of the store.

(4) **Variety of Plants:** The study indicated that it was important to stock a wide variety of potted plants to maintain sales. Apparently, a large percentage of food store sales are made to regular customers. Regular customers will not continue to buy the same variety of plants.

(5) **Pricing:** The effect of price on sales of potted plants cannot be computed accurately from the data in this study, but some observations can be made. At certain levels prices can be raised and lowered considerably without affecting sales. On a 29-cent item, prices could be raised to 39 cents or lowered to 19 cents without a marked effect on volume. It would appear that on the cheaper foliage plants a wide range of prices can be charged without a significant effect on sales, indicating considerable inelasticity at these levels. When prices are above 98 cents there is consumer resistance, although on holidays and special occasions certain plants can be sold at much higher prices.

(6) **Maintaining and Watering Plants:** Sales are definitely affected by plant appearance. Watering plants at the right time and in the right amounts is an elementary but neglected technique in caring for plants. Failure to remove wilted

and unattractive plants from the display area discourages sales.

(7) **Holidays and Special Occasions:** While this study was in progress, extra plants were sold on holidays with considerable success. During these holiday periods, sales of foliage plants were also greater.

(2) **Seasonal Effect:** The data indicated declining plant sales as the summer months approached when consumers go on vacation and plants are available in home gardens. Sales in May, June, July and August were only about 70 percent of average sales during other months of the year. During these months new plant varieties will help to offset the usual seasonal decline.

(9) **Space:** There was no attempt in this study to determine the effect of amount of floor space on sales but experience shows that a certain amount of space is required to maintain a proper display. At least 12 square feet is needed year round and the display rack should be 5 feet high. About 200 ordinary size plants can be displayed in this area.

Problems Revealed

Several important problems were revealed in the study which have to be solved if this new marketing channel is to be developed. These problems are listed below:

(1) **Obtaining Supplies:** The problem of obtaining a constant supply of a wide variety of good quality floricultural products is probably the most difficult problem for this industry. For the present, food store buyers will have to contact suppliers directly and well in advance of delivery in order to get the amount necessary for several stores.

(2) **Delivery:** Since most plants cannot be handled through the chain store warehouse, plants have to be delivered directly to the store by the grower. This is unsatisfactory to the grower unless there is a large volume, because of delivery costs. It is not the best method for the chain store either because the number of stores involved is reduced by the area of delivery. Consequently, advertising cannot be utilized effectively and sales volume is restricted.

(3) **Containers:** One of the reasons for lack of warehouse delivery is the need for proper containers that protect plants in the marketing channels. Although some potted plants are shipped long distances, the wholesale containers are expensive and they do not protect the plants too well. Consumer packs are needed in the store for plants will receive rough treatment from personnel and the housewife.

Space Limits Sales

(4) **Problems of Space:** The lack of space in a retail food store definitely limits sales. Chain stores today become crowded and outmoded almost as quickly as they are built. The number of new products handled by food stores is increasing every day and more products will be sold as fast as they are introduced. Consequently, pressure for space in a food store is great and items which are easiest to handle and which seem to yield the greatest profit per square foot displace those which are thought to produce the least. Since floricultural products are bulky and need care, store managers may displace them before there has been an opportunity to evaluate their profit-making potential.

(5) **Lack of Experience with Floricultural Products:** Personnel in food stores have had little experience in the purchase and sale of floricultural products. Food store buyers are not yet familiar with type of plants, Latin names, care of plants and plant quality. This is a distinct handicap in obtaining supplies and handling plants properly in stores. In time this handicap will be overcome but not without some losses in plant material.

On the basis of this study some recommendations can be made to growers and food store operators. Growers can look upon mass outlets as a potential market for their products or as a potential threat to their retail operations. If they are unwilling or slow in reacting to the opportunities that mass outlets afford, there is no doubt that products will be imported from other areas. Although chain store personnel are not florists or artists they are in this business to stay, and growers will have to adapt themselves to the market demands of this new enterprise.

On the basis of sales in the pilot study it will not be profitable for a grower to deliver to one or two stores. He must have a route of stores close to his production area which will enable him to hire a man to take care of sales. The grower must be prepared to do some of the housekeeping which store personnel should be doing if he is going to maintain sales. This is a large order and may be unprofitable in the beginning but with patience, profits may be forthcoming.

If growers are to satisfy the demands of this market they may have to revise their growing schedule and produce a wider variety of plants.

HELP YOURSELF TO BIGGER PROFITS

PHOSPHATE PRODUCTION
No other process begins to compare with *way-ahead* Sackett SUPER FLO in making normal, fortified and triple super-phosphates of premium quality at *way lower* cost.

MIXED GOODS MANUFACTURE
Your investment in the latest Sackett Methods of producing conventional fertilizers is *guaranteed* to pay handsome returns. We are anxious to prove it.

MODERNIZATION PROGRAMS
Step ahead of competition by entrusting your fertilizer expansion and modernization facility programs to our care. Many of the most forward-thinking fertilizer producers are glad they did.

GRANULAR FERTILIZER
Sackett Equipment leads the field in Granular Production.
The names of the fertilizer companies who have selected Sackett Granulating Processes above all others, read like a "Who's Who in Industry".

NEW PLANTS
Invest your dollars wisely by having Sackett build your new plant. We do the whole job . . . from the inception stage thru building construction and equipment fabrication to operating plant. See us for guaranteed results.

There is nothing that appeals to a man's reason more than plain facts. And, one plain fact is this . . . you can help yourself to bigger profits by resolving ***now*** to replace wasteful obsolete plant equipment with the latest rock-bottom cost methods as exemplified in Sackett Production Processes and Materials Handling Equipment. Why not start the ball rolling by writing or phoning us today?

THE A. J. SACKETT AND SONS COMPANY
SACKETT EQUIPMENT
BALTIMORE · MARYLAND
1727 S. Highland Ave.

Architects and *Manufacturing* Engineers to the Fertilizer Industry Since 1897.

America's Foremost *Creative* designers & Builders of Commercial Fertilizer and Superphosphate Plants . . . Related Production Equipment

The plant specialist in one variety may not find this market profitable at the present time because plants must be delivered directly and a large variety is required. When chain stores are able to handle plants through their warehouses, the specialist may feel more secure.

Growers must also do some research on retail and wholesale containers if they are going to meet the demands of this market. Lighter pots are in order so that the consumer can carry plants along with food items. Many types of consumer packages are needed for cut flowers and growers may find it profitable to prepackage in the greenhouse. Some growers are producing annuals in trays which can be sold profitably in food stores.

The movement of food stores into the merchandising of floricultural products has been rather haphazard. Some store managers and food store buyers saw an opportunity to buy up large amounts of material at specific times and unload them at profitable prices. With one successful venture other purchases were made. In many cases the results were good but too often these purchases met with failure because they were not sound from a merchandising standpoint. Floricultural plants cannot be sold in the long run on this hit-or-miss basis. It is essential to develop a sales area in a store which will be maintained for at least 9 months of the year where customers can expect to find all the products of the floricultural industry.

Experience Needed

Probably the most important factor limiting sales in the food store is the small amount of space devoted to plant sales and the lack of experienced personnel for buying and selling floricultural plants. At the present time some stores are selling ornamentals but without proper facilities for handling them. Unless there is adequate space to take care of plants, a well-experienced person to talk with customers, proper watering facilities and shading, there will be more loss than gain in this business.

An important factor in pricing floricultural products in food stores is the relative inelasticity of demand. This makes it possible and sensible to purchase good quality plants even though they may cost a little more, for retail prices can be higher and consumers will have a much better chance to grow the plants successfully at home.

Despite all of the problems in marketing floricultural products in food and variety stores, considerable progress has been made and growers in New Jersey must recognize the opportunities that exist for them in this new marketing outlet.

Random NOTES & QUOTES

Dow Chemical has sent out a neat little card which explains their position concerning business gifts — "none of its employees should accept business gifts at any time from persons or firms now doing or desiring to do business with us." The card was sent out well ahead of the Christmas season, with the earnest request that recipients adhere to the request.

O

5 Poles are visiting America just now for a survey of US farm achievements. They are all agricultural specialists and will meet their opposite numbers in the USDA, and tour the country. Among the specific points they list in their own release is a session with two major hybrid corn people.

O

Conservation Reserve program for 1958 is putting more stress on participation by whole farm units, rather than just acreage participation. They have found that the way to cut down production is to take the whole farm out of circulation, rather than just part of it. They are giving added emphasis to forestry and wildlife practices, too.

O

Zonolite tells about a Florida grower who expects by 1960 to be producing up to half the state's output of lemons. He is Paul Dickman of Ruskin, who roots his tree branches in vermiculite, heats his rooting beds electrically in winter, and gets fruit two to three years sooner than by budding onto another root stock.

O

Crop chemicals and fertilizers designed to be dissolved before use, but demanding moisture protection to the point of use could well be packed in the new packaging material being offered by Reynolds Metals Co. It is called Reynolon, is transparent, and dissolves quickly in water. So the whole package can be dropped into water, without opening the bag. It closes readily with high-speed heat-sealing equipment, which is already being offered by one machine company, with several others soon to announce.

* * *

Nickels for Know-How has been overwhelmingly favored by North Carolina farmers in a referendum for another year. The results so far show that the program has meant millions of dollars in Tar Heel pockets. The nickel is added to the price of each ton of fertilizer sold in the state, and administered by a committee with one delegate from each of the N. C. counties. Many research problems have thus been financed.

O

Boron is about to get off the ground. Graduating from its well-known usefulness in plant foods, it seems now it is an ingredient of consequence in the development of rockets for stellar space trips, as a key component of the new rocket fuels being worked up.

O

Iowa's conservation commission, in the midst of planning a 10 year program, being about at the end of their original 25-year program, paused long enough to let the public know they oppose any use of water from Iowa lakes and streams for irrigating farm crops. They have managed to prevent the issuance of water permits to some 200 farmers, since the 1957 legislature provided a water code requiring anyone using more than 5,000 gallons a day to get a permit.

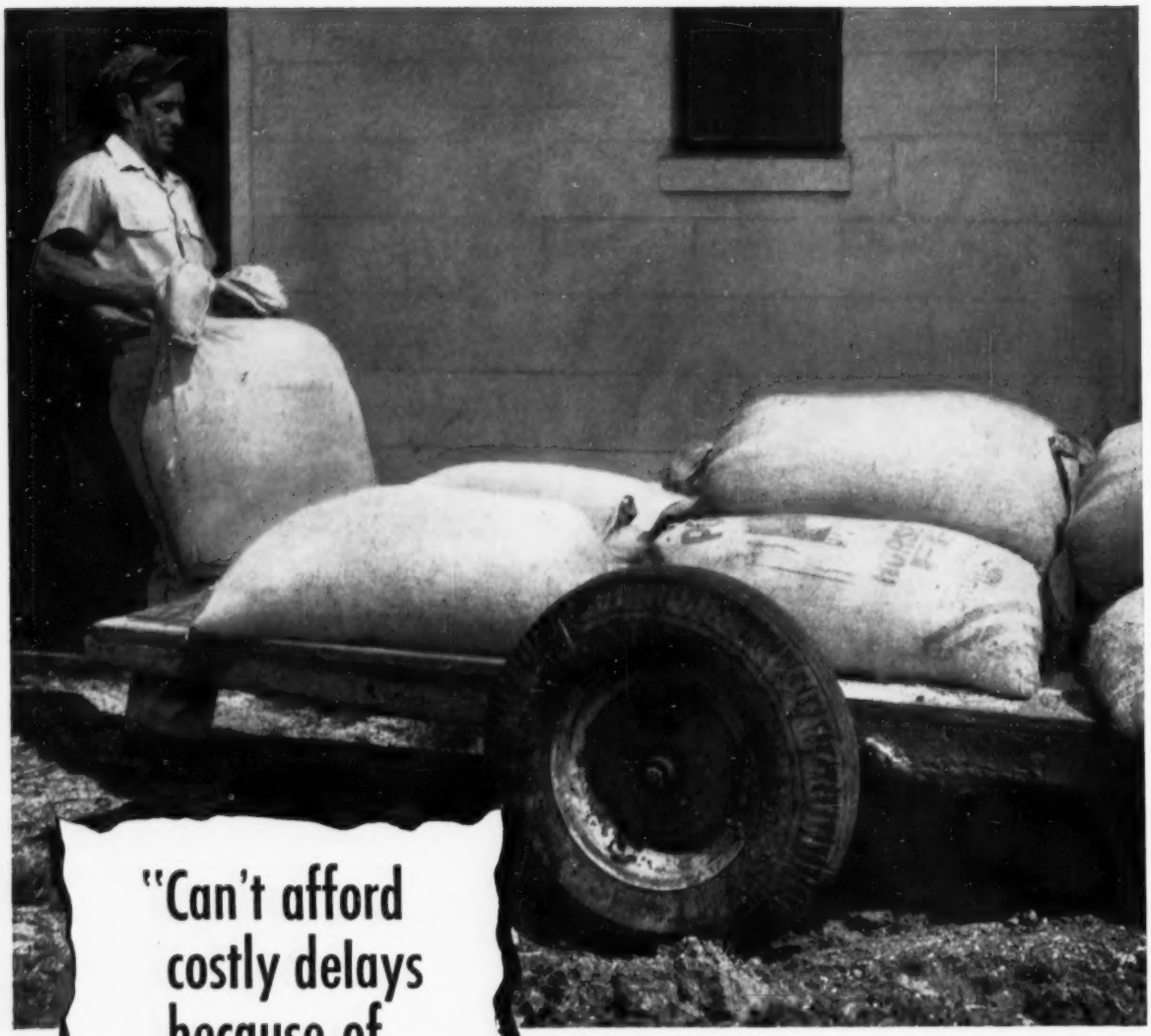
We hope folks out in Iowa won't some day be hungry for lack of soil moisture. Of course, they could always eat fish instead of vegetables.

O

Union Tank Car Co. has announced a new kind of tank car that does what it previously took four different kinds of car to accomplish. Elimination of the dome and the underframe makes it possible for the new car, with minor modifications, to become a car for general service, for acid-carrying, as an insulated car, and as a low-pressure car.

O

Texas International Sulphur's chairman, M. A. S. Makris, has just ordered three sulphur carriers for his recently purchased Three Bays Line — they are 10,000 tonners, and should be delivered early next year.



"Can't afford costly delays because of torn bags,"

says Harlan Jackson, Montgomery, Alabama farmer. "We buy fertilizer in burlap bags because we can handle them as roughly as we want. Then too, the re-use and resale value of the bags are big reasons for burlap. We make a nice cash saving from bag returns over the year, and we keep some empties for countless uses around the farm."

The resale value of the burlap bag gives your customer a cash discount on every ton of fertilizer he buys.

Just ask your own customers—

they'll tell you that burlap

Is strong — takes dragging, dropping, *man-handling* — any tough job on the farm.

Gives good ventilation — keeps farm supplies and products fresh.

Laughs at sudden showers — wetness or dampness can't weaken it.

Saves money — extra value from re-sale and re-use.

Saves storage space — stacks to any height without slipping.

Has 1000 uses — always in demand on the farm (popular with farm wives, too!)

THE BURLAP COUNCIL

of the Indian Jute Mills Association

155 East 44th Street, New York 17, N. Y.

China is bragging via Peiping radio about having multiplied their chemical production—including fertilizers and crop chemicals — 18 times since 1949. Could be!

O

An envelope maker questionnaired the buying habits of its employees as to where they buy what. Turned out that the big bulk of personnel purchases were made with customers of the envelope outfit. So they passed this data along to their customers, who were naturally very pleased.

O

An Indiana outfit is doing well with a vinyl-coated nylon fabric that blows up into a temporary structure, for construction jobs and the like. Even outdoor swimming pools have been covered with it—to keep off the rain, no doubt. But there seems a likelihood that in the broad field of county fairs, farm demonstrations and such, some of our readers could well use a device like this. Three men can put one up in an hour.

They range in size from 3,000 to 100,000 square feet. Though the air-support is low pressure you can walk on the top of it. The roof will support heavy snow and withstand high-velocity winds. Sounds like quite a thing!

O

Weeds were grown with painstaking care by J. Y. Oakes of the Red River Valley AES, Louisiana, so he'd have some to use in the demonstrations at the Beltwide Cotton Mechanization Conference October 3-4 You may be surprised to know they grew all right, though he had to use a touch of irrigation.

RESEARCH RESULTS & REPORTS

Oklahoma A&M's experiment station has just published two fine technical bulletins: "Fixation and Release of Potassium in Several Eastern Oklahoma Soils" is #T-39; "Anhydrous Ammonia and Ammonium Nitrate Fertilizers for Wheat" is #B-493.

O

Wheat tolerance to fertilizer, applied with the seed, has been the subject of research by Michigan State. They find that fertilizer must go beyond 270 pounds of active plant food per acre before the seed is damaged enough to reduce yield.

O

Rayonier — the cellulose people — have developed a new technique of fertilizing pulpwood (their raw material) with standard agricultural equipment. They borrowed a spreader from a nearby farmer, hooked it to a tractor, and put the fertilizer in the forest.

This would seem to call for a planted forest, with passage way for the tractor.

This development was incidental to a project testing the response of Southern pine to plant food, in cooperation with Nitrogen Division. They are testing on 18 plots with varying rates and combinations of urea, ammonium nitrate, ammonium-nitrate-limestone, triple super, muriate of potash. About five years from now they will have conclusive answers.

O

Profund changes have taken place in fertilizer practices during the past 25 years, according to the head of Cornell's vegetable crops department, Charles B. Sayre. He is talking about New York State, of course, and this is what he says:

"After rich, virgin soil has been farmed for a number of years, the fertility level becomes depleted, with phosphorus showing depletion first, followed by nitrogen and then potash," he states. "Over the past 25 years this pattern of fertilizer needs has occurred in growing vegetables for processing in western New York.

"In fertilizer experiments at the Station 25 years ago the greatest yield increases in all processing vegetables were obtained from complete fertilizers especially high in phosphorus," explains Dr. Sayre. At that time very low analyses fertilizers were most common and only about 300 pounds per acre were normally applied.

"Our experiments emphasized the inadequacy of such treatments and showed the benefit of higher analysis fertilizers and heavier applications," continues the Station scientist. "The 4-16-4 formula met this requirement and proved especially effective for tomatoes, peas, sweet corn, cabbage, and snap beans, with a 5-10-10 for beets supplemented with salt and borax in recent years for this crop.

"Growers have been using increasing amounts of fertilizer and progressively higher analyses mixtures. Although the analysis has nearly doubled on the average in recent years, yet growers have not reduced the rate of application in proportion. As a result, the phosphorus-fixing capacity of many soils has been satisfied and they now have a good supply of available phosphorus. Our present experiments, therefore, are attempting to determine the accumulation of available phosphorus and potash in these heavily fertilized soils to guide growers in their fertilizer practices. These experiments show the need for less phosphorus and for more nitrogen, consequently we are now recommending a 10-10-10 mixture for many processing crops."

O

Monsanto has reported that phosphoric acid is a good soil stabilizer. Their laboratories have found that 2% phosphoric acid, added to a plastic clay produces a compacted soil that can take long exposure to water and winter. They report even better results when you add their Amine ODT. Highway departments are interested and working with them.

O

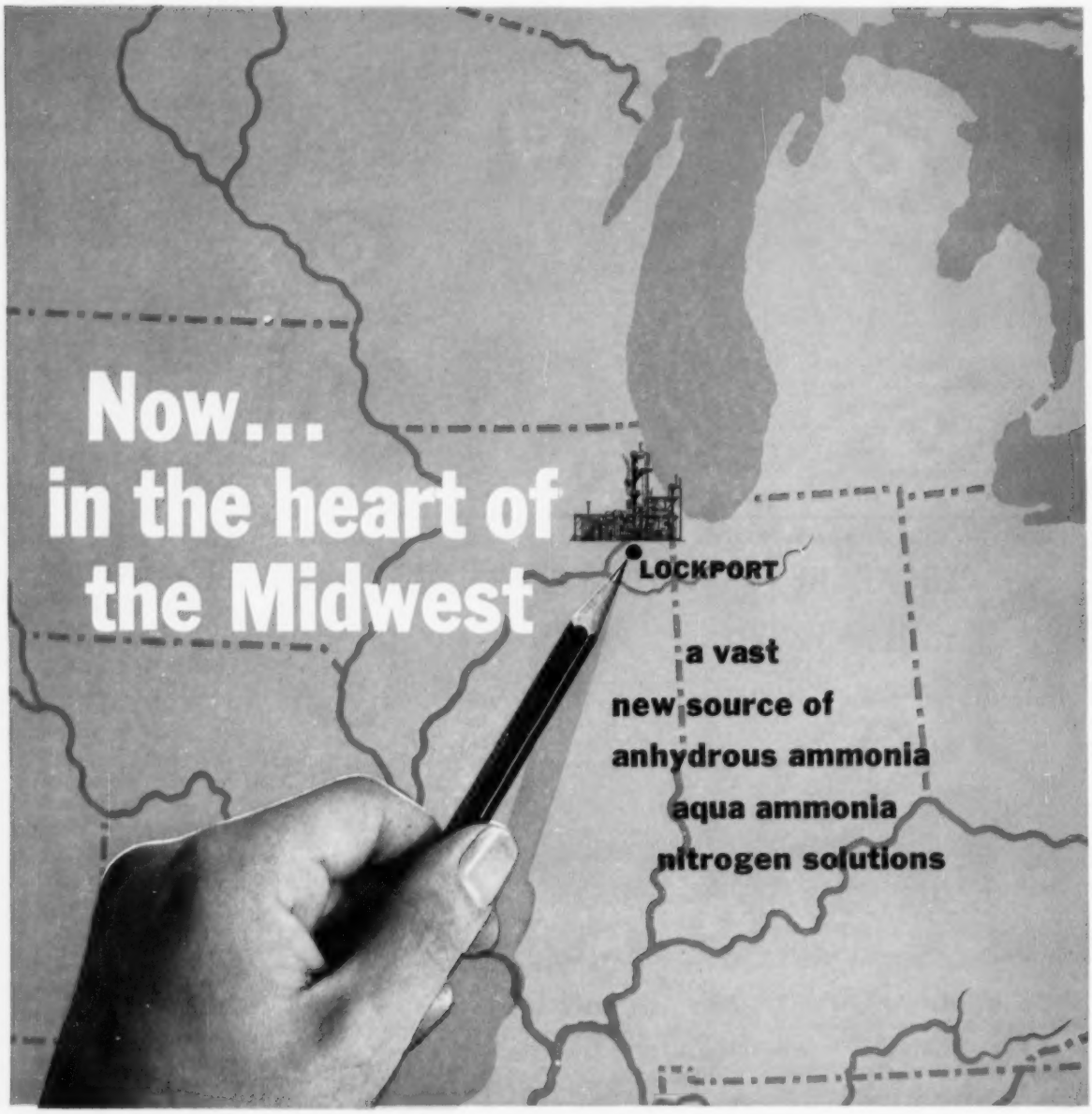
Nuclear-Chicago Corp. has a faster and simpler way to determine the moisture and density of soils. They have developed a portable device they call the d/M-Gauge, which measures the radioactivity of masses of different moisture content and density. It is quick. The operator simply inserts the correct radioactive probe into the soil, and gets a reading, which he interprets from a chart.

O

Two Indian scientists have come up with a new type of nitrogen-fixing bacterium. The new organism apparently does not itself live on the nitrogen. The discovery was made at the Jute Agricultural Research Institute at Barrackpore, West Bengal.

O

DuPont has patented an antibiotic that controls some plant diseases, they announce. It is called 1-81-d-1s so far, and it is reported especially active against fungi that blight tomato plants, against an organism that causes off-flavors in beer, and against certain diseases of wheat, barley and corn.



Texaco's new Lockport plant is centered among all major rail, water and truck routes—a reliable source of ammonia and nitrogen solutions.

TEXACO LOCKPORT (ILL.) AMMONIA PLANT NOW MAKING DELIVERIES

Orders for anhydrous and aqua ammonia, and nitrogen in a variety of solutions are mounting. The advantages of doing business with Texaco Lockport are compelling:

Texaco closeness: The new ammonia plant is located right in the heart of the farm belt. Shipping distances are shorter, formulators get faster and better service.

Texaco uniformity: The Lockport plant is new from top to bottom—new processing equipment to assure product uniformity; new handling equipment; and a brand-new transport fleet to speed deliveries and protect purity in transit.

Texaco service: Texaco is famous for its service. The Texaco man will see that your orders are handled according to instructions and that deliveries are scheduled to tie in with your operations.

For fast reliable petrochemical service, call or write The Texas Company, *Petrochemical Sales Division,* 332 South Michigan Avenue, Chicago 4, Illinois, or 135 East 42nd Street, New York 17, N. Y.

TEXACO
PETROCHEMICALS

Iron-clad protection for repeat fertilizer sales

with VERSENOL IRON CHELATE

The best way to be sure iron deficiencies of soil won't keep your formulations from performing at their best is to include VERSENOL® IRON CHELATE . . . your iron-clad protection for repeat sales.

Just small amounts of VERSENOL IRON CHELATE, an organic form of iron, correct deficiency in either acid or alkaline soils. It's a more effective, longer lasting method of supplying iron than the inorganic sulfates. Whether your customers are citrus growers, truck gardeners, nurserymen, greenhouses, landscapers or home gardeners, they'll be quick to notice the difference VERSENOL IRON CHELATE makes. Plants turn and stay a healthy, rich green. Growth is improved. Bloom is enhanced. And the other elements in your fertilizers work to best advantage . . . and to your credit.

Dow makes two formulations: VERSENOL IRON CHELATE and VERSENOL IRON CHELATE on Vermiculite. The Vermiculite formulation is easy to mix with dry fertilizers and actually flow-conditions your regular fertilizer for easier application. The concentrate can be mixed into liquid formulas. For further information, write directly to: THE DOW CHEMICAL COMPANY, Agricultural Chemical Sales Dept., Midland, Michigan.

WEED AND BRUSH KILLERS, SOIL FUMIGANTS, GRAIN FUMIGANTS, INSECTICIDES, FEED ADDITIVES, ANHYDROUS AMMONIA, DEFOLIANTS.

Dow presents
THE RED FOLEY SHOW
every Saturday. See radio listing for time and station.

YOU CAN DEPEND ON DOW

Personals

Potash Company of America has announced appointment of Joseph P. Scroggs as sales representative for the Georgia-Tennessee territory. Mr. Scroggs will also work the Florida territory in conjunction with Paul C. Ausley. J. Robert Mell, who in the past has serviced these accounts, has been transferred to their Washington office. Immediately prior to joining the Potash Company of America, Mr. Scroggs was assistant sales manager for the Atlanta office of Lion Oil Company.

Carroll E. Walls, a specialist in agriculture, who has been assigned as sales representative for Du Pont nitrogen products in Alabama, Mississippi, and Georgia, with headquarters in Atlanta, effective October 1. He joined the Du Pont Polychemicals Department in 1956.

John F. Kirk, vice president, **Velsicol Chemical Corporation,** has announced appointment of **Kimon T. Karabatsos** as director of government relations.

For the past two years, Mr. Karabatsos was director of legislative and special services for the National Agricultural Chemicals Association.

* * *

The Smith-Douglass Co. have announced the promotion of their Wilmington manager, **J. J. Pointer,** to assistant sales manager for the company's Eastern Fertilizer Division, headquartering at Smith-Douglass home offices in Norfolk.

John J. Dalrymple, veteran S-D salesman will succeed Mr. Pointer as Wilmington plant manager.

Four Smith-Douglass Norfolk factory employees who were honored at a recent ceremony in recognition of their length of service. Left to right are: Norfolk factory superintendent Herman Powers; L. M. Hanbury, who received a 20-year pin; W. J. Rountrey, G. E. Ketchum, and J. W. Cannon, who each received 10-year pins; and Smith-Douglass production manager, J. H. Zwemer, who made the presentations.

G. A. Houghton, Jr., formerly assistant general manager of the Forest Industries division of **Calumet & Hecla, Inc.,** was named general manager, effective August 22. He succeeds his father, **G. A. Houghton, Sr.,** who has reached the company's normal retirement age, but who will continue with the company as assistant to the president. In this capacity, he will work on special assignments relating to Forest products and will act as a consultant on sales and operating activities of the Forest Industries Division.

* * *

Walter Shorter, vice president in charge of paper and bleached board sales for **Union Bag—Camp Paper Corporation,** was named vice president and general sales manager for the company. In his new position he will be responsible for the direction and coordination of all major line sales activities.

At the same time the company announced the appointment of **Clark Reynolds** as assistant to the vice president and general sales manager. A member of the Union organization since 1940, Mr. Reynolds has served in various sales capacities as well as manager of the sales-manufacturing control department.

* * *

Clarke B. Ash has joined the public relations department of **Olin Mathieson Chemical Corporation** as assistant publicity manager, chemicals, it was announced by **Henry Hunter,** director of public relations.

Mr. Ash will work with the corporation's industrial chemicals, agricultural chemicals and high energy fuels operations. He will report to **Kenneth M. Baker,** publicity manager, chemicals.

Special recognition was given to **John Miller, NPFI** president, at a luncheon during a Kentucky Fertilizer meeting at the University of Kentucky on Sept. 4.

Bruce Poundstone, Kentucky State chemist, in paying tribute to Miller, cited the contributions NPFI's president has made to the industry program in Kentucky as well as in the Nation. **Dr. Russell Coleman,** NPFI executive vice president, also paid a brief tribute to Mr. Miller.

* * *

Dr. James G. Horsfall, director of **The Connecticut AES,** has been appointed to the Advisory Committee for Biology and Medicine of the Atomic Energy Commission by Chairman Lewis L. Strauss.

* * *

The American Agricultural Chemical Company Sept. 10 announced that **T. J. Mahoney,** formerly of the Havana, Cuba sales department, has become responsible as sales manager for Havana branch sales and sales promotion.

Philip Stauderman, formerly salesman for the Carteret, New Jersey branch, has become responsible as assistant manager of Pierce, Florida sales.

* * *

The appointment of **James S. Tolon** as sales representative for **Zonolite Company** was announced August 23 by the firm's Terra-Lite Division.

Mr. Tolon will cover Ohio, Western Pennsylvania, and West Virginia, serving golf courses, fertilizer companies, and garden supply dealers. The firm mines and processes vermiculite, a mineral soil conditioner and agricultural chemical ingredient.

S. H. McAllister, left, who has been moved from director of Shell Development's agricultural research division at Denver, to succeed F. H. Hatch, right, retiring as manager of the agricultural chemical sales division, after more than 25 years with Shell.

William King Self, president of **Riverside Fertilizer Company,** Jackson, Miss., and four other related concerns, has been made a director of the Southern Bell phone company. Riverside Chemical is the largest crop chemical concern in Mississippi.

* * *

Two Chicago scientists are serving as research advisors at the first laboratory center established in Colombia specifically for technological research.

Drs. Milton E. Nelson and **C. Roland McCully,** both of **Armour Research Foundation** of Illinois Institute of Technology, left for Bogota, Colombia in September, according to **Paul B. W. Gollong,** manager of the ARF international research department.

Research operations at the center are aimed at broadening the economic base of Colombia by the development of its agricultural potential, Mr. Gollong explained.

Appointment of three general managers and three assistant general managers, to head various divisions of **American Cyanamid Company,** and the organization of a new General Services division were announced September 10 by **Dr. W. G. Malcolm,** Cyanamid president. With the exception of the assignments to the new division, all appointments have been made to fill vacancies created by other recent promotions, Dr. Malcolm pointed out.

The General Services Division is assigned responsibility for the office services department, personnel relations department, medical department and suggestion plan. Named general manager of the new division is **Henry C. Little,** former assistant general manager, Phosphates and Nitrogen division. **John W. King,** former manager, office services, is named assistant general manager, General Services division.

Promoted from assistant general manager to their respective divisions are **Clifford D. Siverd,** Farm and Home division; and **Thomas P. Forbath,** Engineering and Construction division.

Raymond M. Nee, former chief engineer at Cyanamid's Pearl River, N. Y. plant, has been appointed assistant general manager, Engineering and Construction division.

Succeeding Mr. Little as assistant general manager, Phosphates and Nitrogen division, is **Dr. Jack T. Thurston,** former director of laboratories at the Company's Stamford Conn. research center.

* * *

Allan B. Clow and **General Anthony C. McAuliffe** have been named vice presidents of **American Cyanamid Company** it was announced Sept. 6 by Dr. Malcolm.

Mr. Clow has been named vice president for marketing, succeeding Dr. Malcolm, who became president of the company on September 1st. General McAuliffe has been named vice president for engineering and construction.

* * *

Harrison B. Rue has been placed in charge of sales of textile, Saxolin and small paper bags by the **Chase Bag Company,** it was announced by **W. N. Brock,** vice president and general sales manager.

Mr. Rue has been Eastern regional sales director for the company, and in addition was manager of its Buffalo manufacturing branch for the last five years. He joined Chase as a sales representative in New Orleans in 1946.

John B. Trigg, formerly sales manager at Buffalo for Chase, succeeds Mr. Rue as manager of the branch. He will also continue to direct activities of the sales force. Mr. Trigg has been with Chase since 1939.

* * *

Jack C. Barry, superintendent of **International Minerals & Chemical Corporation's** mixed fertilizer plant at Greeneville, Tenn. since 1945, retired last month after 44 years of service with the company. He had previously superintended their mixing plants at Texarkana, Ark. and at Norfolk, Va.

A. N. Harmon, assistant superintendent at Greeneville since 1938, has been named to succeed Mr. Barry as superintendent.

* * *

Erskine Parks of Boynton Beach has been named Southeast Florida sales manager for **Kenco Chemical Co.,** Summerdale, Ala., manufacturers of liquid and water-soluble mixed fertilizers. He will manage warehouse at Delray Beach, Homestead and Belle Glade as the firm expands its sales activity of supplemental mixtures for citrus and truck crops.

* * *

Rubel Palmer has rejoined **Northeast Mississippi Fertilizer Co.** at Amory as a partner and will be in charge of sales. For the past five years he had been associated with **Prairie Liquid Fertilizer Co.,** Aberdeen, Miss.

Jack F. Dulaney, left, and Harold Kingery, who have been made district salesmanagers by Nitrogen Division, Allied Chemical and Dye Corp. Mr. Kingery is in charge of South-Central district, headquartering at Memphis, and will direct sales for both fertilizer manufacturing materials and direct application; Mr. Dulaney will supervise fertilizer manufacturing materials sales in the Atlanta district, with headquarters in that city. Both have been with Nitrogen Division for some years.

ALABAMA

Tennessee Coal & Iron, U. S. Steel division, have installed granulated ammonium sulfate facilities at their Fairfield plant. The equipment consists of a flaking mill, a direct heat drier, two granulating mills, a bulk loading station, and bagging and shipping equipment.

ARIZONA

New Pacific Coal & Oils president, **Frank E. Ruben,** reports that they are making a profit of $125 a ton before depreciation and taxes from the sale of the guano they are taking from the caves in the Grand Canyon.

ARKANSAS

Farmers Granary, Patterson, are building a liquid fertilizer operation, to be ready for this season. Capacity, 5 tons in 15 minutes. The plant, being housed in a 40 x 60 foot building, was designed by **Robert Thomas Martin** of Memphis, and machinery will be installed by **J. C. Carlile,** Denver. • • •

Waldo Fertilizer's plant at Magnolia was destroyed by fire August 23. It had been closed for nearly a year.

CALIFORNIA

Valley Nitrogen Producers, Incorporated, Fresno, has amended the articles and bylaws to convert the enterprise into an agricultural nonprofit cooperative corporation.

Carl H. Haas, president, said the board also decided to erect a sulphuric acid plant and other necessary facilities in addition to a $5,000,000 anhydrous ammonia plant.

Mr. Haas said this will entail an additional $1,000,000 investment for the production of dry fertilizer materials such as ammonium sulphate, superphosphate and mixed fertilizers.

He declared sites are under consideration in Fresno and Madera Counties and a decision is expected to be made within 60 days.

The corporation has more than 500,000 acres of land signed up with growers between Los Banos, Merced County, and Bakersfield. Present plans call for a daily production of nearly 150 tons of anhydrous ammonia. There will be about 60 employes.

Mr. Haas currently heads the **Haas Ammonia and Fertilizer Company** in Modesto which will be absorbed by the new group.

New board members are **C. E. Sullivan,** Yuba City, Sutter County, president of **Golden Empire Walnut Association** and vice president of **Diamond Walnut Association; H. L. Stanley,** manager of **Stratford Cooperative Gin;** and **Lester Heringer,** Clarksburg, Yolo County, a sugar beet grower.

The other directors include **Mal Carberry, Jack Harris, Roland B. Hill, Victor I. Sandell,** all of Fresno; **Sam Hamburg** of Los Banos and **Sherman Thomas** of Madera.

• • •

Hercules Powder Company will start construction immediately of facilities to produce 10,000 tons per year of urea at its Hercules plant. Anhydrous ammonia and carbon dioxide are both currently produced at the plant. Completion of the urea facilities is expected by late 1958.

FLORIDA

Growers Fertilizer Cooperative, Lake Alfred, have installed a mobile radio operation to keep fieldman's cars in touch with the office. These fieldmen handle the various grove caretaking jobs the company offers, and the radiophone hookup speeds up movement between jobs, according to **R. I. Brumbaugh,** assistant treasurer. • • •

F. E. C. Fertilizer, Homestead, is clearing an adjacent property, 125 x 150 feet, which they bought in March. Until it is needed for plant expansion it will be used for parking and loading, according to the manager **Henry Pridgen.**

• • •

Florida Lightweight Products, Lake Wales, has developed a way to make a lightweight aggregate out of phosphate slimes, which have been considered sheer waste, without hope of redemption. W. R. Gooch announces a $250,000 plant for the purpose to be built near Bartow.

ILLINOIS

Karl Schewe is building a $50,000 liquid fertilizer plant at Beardstown, which will employ some 12 people. "Neighbor trouble"—the objections of local citizens—was overcome when aldermen visited a similar plant at Springfield, and "found no odors and no danger of explosion."

KANSAS

Hi Plains Dehydrating Company, newly incorporated Dodge City firm, has announced plans to build a fertilizer plant which will employ an estimated 10 to 15 persons. The company will manufacture, dehydrate and process agricultural products.

KENTUCKY

West Kentucky Liquid Fertilizer, Hopkinsville, has celebrated its opening with "farmer field days." Each visiting farmer was presented with a gallon of fertilizer, which the plant produces at the rate of 20 hourly tons. **Morris T. Woosley** is manager.

MARYLAND

Miller Chemical and Fertilizer Corp. plans to begin transfer of Baltimore manufacturing operations to its Hanover, Pa. site. Baltimore's newly-imposed municipal tax on machinery and inventories was "one of the big factors" prompting the move, according to Board Chairman **W. Newton Long.** A five-year expansion program calls for construction of facilities at Hanover, and progressive transfer of the Baltimore plant functions to thePennsylvania location.

MISSISSIPPI

Champion Chemical is in production with its new $200,000 plant at Canton, which turns out crop chemicals.

• • •

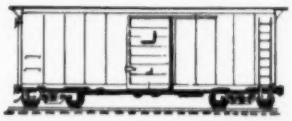
Farmer's Exchange, Jackson, has been chartered to manufacture and sell fertilizers and other agricultural items.

MISSOURI

Farm Bureau Service Co. has undertaken a bond drive to raise $120,000 for a bulk fertilizer installation to be located at Delta. It is planned as a pole-type structure, with a capacity of 800 tons of bulk and 500 tons of bagged material.

NEW MEXICO

National Potash has been awarded the potash lease on 1,840 acres of public land near Carlsbad, with a bid of $1,867.34, the highest of five bids opened.



TRIPLE SUPERPHOSPHATE

Phillips 66 Triple Superphosphate contains 46% available phosphoric acid. It has the physical properties essential for maximum ammoniation efficiency.

AMMONIUM NITRATE

New, free-flowing Phillips 66 Prilled Ammonium Nitrate contains 33.5% nitrogen. The small, coated prills resist caking, handle easily. Depend on Phillips 66 Prilled Ammonium Nitrate for top-notch crop response as a direct application material. It's an ideal companion high nitrogen fertilizer for your quality mixed goods.

5

PHILLIPS

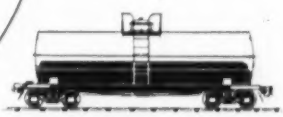
Materials for the Production of Premium Fertilizers

NITROGEN SOLUTIONS

Get more N per dollar! There are seven Phillips 66 Nitrogen solutions for use in preparation of high-analysis fertilizers and the ammoniation of phosphate materials. Use these solutions to help keep manufacturing costs low; help rapid, thorough curing.

AMMONIUM SULFATE

New premium-quality Phillips 66 Ammonium Sulfate contains 21% nitrogen, 23.8% sulfur. It is *dry*-cured to remove excess moisture, prevent caking. Uniform dust-free crystals flow freely, mix easily. Ideal for all analyses of mixed goods and for direct application. Available in bags or bulk.



ANHYDROUS AMMONIA

Phillips 66 Agricultural Ammonia containing 82% nitrogen is a convenient, economical source of nitrogen for the formulation of mixed fertilizers. Immediate tank car shipments are assured through Phillips production facilities in the Texas Panhandle and at Adams Terminal near Houston. Phillips also has tank car pools at many key points.

PHILLIPS CHEMICAL COMPANY

A Subsidiary of Phillips Petroleum Company, Bartlesville, Oklahoma

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NEW YORK, N. Y.—*80 Broadway*
OMAHA, NEB.—*6th Floor, WOW Building*
PASADENA, CALIF.—*330 Security Bldg.*
RALEIGH, N. C.—*401 Oberlin Road*
SALT LAKE CITY, UTAH—*68 South Main*
SPOKANE, WASH.—*521 East Sprague*
ST. LOUIS, MO.—*4251 Lindell Blvd.*
TAMPA, FLA.—*3737 Neptune St.*
TULSA, OKLA.—*1708 Utica Square*
WICHITA, KAN.—*501 KFH Building*

PHOSPHATIC ACID SOLUTION FROM NEW PLANT CUTS COST OF MAKING FERTILIZERS

Many fertilizer manufacturers can now cut their costs by formulating with Phosphatic Fertilizer Solution (wet-process phosphoric acid). Use of this chemical from U.S.I.'s new plant will, in many cases, enable you to produce standard or special granular formulas at lower cost. It will also allow you to make higher analysis grades of fertilizer. To help you determine if and how you can profit by using phosphoric, the U.S.I. Technical Service Engineers are ready to work with you.

And you can be assured of a steady supply of this basic fertilizer material . . . because the entire production of Phosphatic Fertilizer Solution at the new U.S.I. plant at Tuscola, Illinois, is available for non-captive commercial uses. This amounts to 30,000 tons of P_2O_5 per year.

You can, in fact, get *all* of the following fertilizer basics in addition to PFS on *short notice locally* from U.S.I. Anhydrous and Aqua Ammonia . . . Ammonium Nitrate . . . Nitrogen Solutions . . . Sulfuric Acid . . . and Nitric Acid.

CALL IN THE U.S.I. MAN NOW

May we suggest that you get in touch with your U.S.I. man. Let him work out optimum formulations with you. He's experienced in determining the factors that make up formula cost. He will also be glad to assist you during your trial runs.

If your costs can be lowered by using PFS (and they probably can) he'll be able to help you find out. Quickly. Reliably.

If you would like the U.S.I. man to work with you, write to us—or better still telephone collect.

HEAVY CHEMICAL SALES

U.S.I. INDUSTRIAL CHEMICALS CO.

Division of National Distillers and Chemical Corporation

99 Park Avenue, New York 16, N. Y.

OHIO

F. S. Royster has opened a new warehouse at Oakwood with a capacity of 1200 tons.

PENNSYLVANIA

Organic Corp. of America, Pittsburgh, it is reported, may soon be controlled by **Doris Duke,** "world's richest girl," if she exercises the options. The concern was forced to close its doors early last month, according to local reports, and Duke money has already been advanced.

TENNESSEE

Velsicol Chemical Corporation has announced it will produce Parathion (ethyl) at its Memphis plant. According to **J. F. Kirk,** vice president, production will start in November. At that time, Methyl-Parathion operations will be transferred to Memphis.

The company recently announced the availability of Velsicol gibberellins.

WASHINGTON

Stauffer's plant at Tacoma has solved the fish problem caused by discharge from the process. A polyethylene pipe 300 feet long goes out into the bay and the discharge end is 50 feet below water level, at which point the fluosilic-acid solution cannot harm the fish.

ARGENTINA

Atanor, Buenos Aires, and Olin Mathieson have joined forces to produce crop chemicals for South American agriculture. **Mathieson-Atanor Co.** has an initial capital of some $1.800,000 but this can be run up to $25,000,000 as needed in the next several years.

BRAZIL

S. A. Industrial de Minerios e Acidos, Rio de Janeiro, is hunting $1,-000,000 for the mining of pyrites and sulphuric acid production. They hold mineral rights in 1,447 acres of pyrite area at Ouro Preto.

CANADA

International Minerals & Chemical Corporation plans to spend more than $20,000,000 on construction near Esterhazy, Saskatchewan, of "the most modern and efficient potash mine in the world."

Louis Ware, president of IMC and its Canadian subsidiary, **International Minerals & Chemical Corp., (Canada) Ltd.,** reports that the new mine, for which a 3,000 foot shaft is now being sunk, would play an important part in "making the North American continent self-sufficient in its need for potash for centuries to come.

"With continued development of Saskatchewan's ore reserves by this company and others, Canada and the United States ultimately will account for a major part of the world potash supply," he said.

The new mine shaft, to be more than a half mile deep and 18 feet in diameter, will cost about $4,000,-000. Mining equipment, a refinery, large storage buildings, machine and repair shops and additional plant facilities will account for the remainder of the estimated cost, he explained.

Tentative plans call for the employment of from 100 to 150 persons at the mine. A small, experienced staff of technicians and experts from the company's Carlsbad, New Mexico, operation will train local workers at the outset, with local workmen taking over as their training is completed.

Utah Construction Company, of San Francisco, is constructing the mine shaft and several surface structures at Esterhazy. The development area includes 450,000 acres which IMC controls under permits.

* * *

Jefferson Lake Sulphur will join with **Westccast Transmission** to build a sulphur extraction plant in the Crowsnest Pass area, and Jefferson will build a recovery plant in Calgary.

NETHERLANDS

Compagnie Neerlandaise de l'Azote, has put into operation its Sluiskil urea plant in Zeeland. The company, one of the leading Dutch producers, now makes ammonium sulfate, potassium nitrate and will soon go into production with its fifth ammonia installation.

PAKISTAN

The Pakistan Industrial Development Corporation's calcium superphosphate plant at Lyallpur is now in production. It has a potential capacity of 15,000 annual tons.

PERU

Fertilizantes Sinteticos, S. A. expects to produce 25,000 annual tons of ammonium nitrate, 5000 annual tons of refined ammonium nitrate, for fertilizer purposes, in its $9,000,-000 plant at Callao. Equipment is coming from Italy, with **Montecatini** supplying technical assistance.

SOUTH AFRICA

African Explosives and Chemical Industries second nitrogen fixation plant, planned near Johannesburg, will permit rail shipment of nitrogenous materials to Southern Rhodesia.

Technical Book Prepared By Nitrogen Division

A new, 68-page technical book on anhydrous ammonia and ammonia liquor has been prepared for the industry by Nitrogen Division, Allied Chemical & Dye Corp.

The book fully describes anhydrous ammonia and ammonia liquor, listing their chemical and physical properties, specifications, handling and storage features unloading methods, analytical procedures, and bibliography.

Graphic illustrations include data pertaining to viscosities, density, vapor pressures, boiling and freezing points, and other characteristics.

Copies of this book may be obtained by writing on company letterhead to Nitrogen Division, Allied Chemical & Dye Corp., Dept. ALA, 40 Rector Street, New York 6, New York.

Dr. Black's Book On Soils and Plants

"Soil-Plant Relationships" by C. A. Black, published in August by John Wiley & Sons, 440 Fourth Avenue, New York 16, N. Y., focuses on the important relationships, with emphasis on soil as a substrate for plant growth.

Dr. Black brings together the pertinent facts and ideas about soil properties and soil behavior, with a minimum of technical details. While the concepts are illustrated by examples from specific locations, a general application is sought after through the formulation of essentials. This leaves open the analysis and interpretation of a variety of geographical conditions.

One of the high points in "Soil-Plant Relationships" consists of the author's integration of soil properties with the response of plants. Dr. Black also draws conclusions where necessary, and comes up with tentative analyses where situations have not yet been clearly established. His chapter headings are devoted to: soil composition, water, aeration, acidity, salinity, and alkalinity; exchangeable bases; nitrogen; phosphorus; and potassium.

Dr. Black is professor of soils in the Iowa State College department of agronomy. His principal research has been in the areas of soil and fertilizer phosphorus and soil-plant relationships.

"Soil-Plant Relationships "contains 332 pages and is priced at $7.00.

fertilizer safety section meets October 21-22

The program is complete and final arrangements have been made for an excellent turnout of industry representatives expected at Chicago this month for the Fertilizer Section safety meeting, according to General Chairman E. O. Burroughs, Jr., of F. S. Royster Guano Co., Norfolk.

Sessions of the Fertilizer Section, being held in conjunction with National Safety Congress' convention, are slated for the La Salle Hotel October 21 and 22. Format of the program will follow that of previous meetings, with business meetings held both afternoons, and mornings left open for informal discussion or attendance at other Congress activities.

Monday, October 21

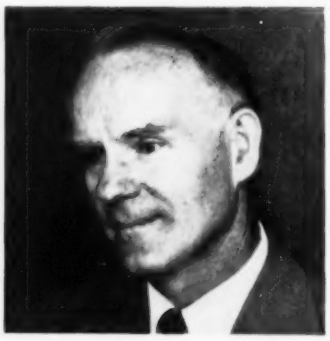
2:00 p.m. Opening remarks by General Chairman
2:10 p.m. Election of 1957-58 officers
2:20 p.m. "Front Office Safety" by Frank A. Gerard, safety manager, Olin Mathieson Chemical Corp.
3:00 p.m. "Safety—A Retreat or a Challenge" by John H. Foulger, M.D., director of Medical Research, E.I. Du Pont De Nemours & Co.
3:40 p.m. Discussion.
3:50 p.m. "How We Can Profit From Thorough Accident Investigation" by James E. Kavanaugh, supervising engineer, Engineering and Loss Control Division, The Travelers Insurance Co.
4:25 p.m. Discussion.

Tuesday, October 22

Presiding: General Chairman Elect.
12:00 noon Luncheon—Speaker T. J. Clarke, controller, Cooperative G.L.F. Exchange, Soil Building Division; Topic: "The Man Who Wasn't There."
2:00 p.m. Announcements.
2:10 p.m. "Visualizing Ammonia Hazards." by E. V. Anderson, safety engineer of Johnson and Higgins.
2:40 p.m. Discussion.
2:50 p.m. "Using Acids and Nitrogen Solutions Without Hazard — Carelessness Can Be Costly." by Elmer Perrine, technical representative, Nitrogen Division, Allied Chemical & Dye Corp.
3:35 p.m. Discussion.
3:50 p.m. "Observations On Latin American Safety," by A. B. Pettit, director, Industrial Health and Safety, W. R. Grace & Co.

Chairman Burroughs

Clarke



Perrine

Pettit

Four Years of Safety

The National Safety Council reports that four years of Fertilizer Section safety work has brought about a 56% drop in the disabling injury frequency rate of those reporting, and that the number of plants entering the annual contest has increased more than a third.

Fifty Attend N. C. Safety Unit

Fifty supervisors and superintendents of fertilizer manufacturing plants in North Carolina and six other East Coast states registered for the 2-day National Safety Council supervisory training course in Wilmington.

E. O. Burroughs Jr. of Norfolk, Va., chairman of the fertilizer section of the safety council, addressed the group during a morning session. He cited a 43 per cent decrease in the accident rate in the industry between 1953 and 1956 and praised the industry for its accident prevention program.

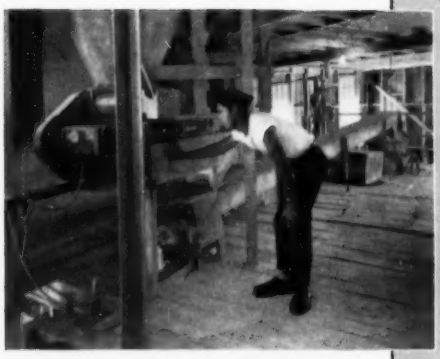
In addition to safety discussions, the schedule included a banquet at Wrightsville Beach and tours of the Wilmington area.

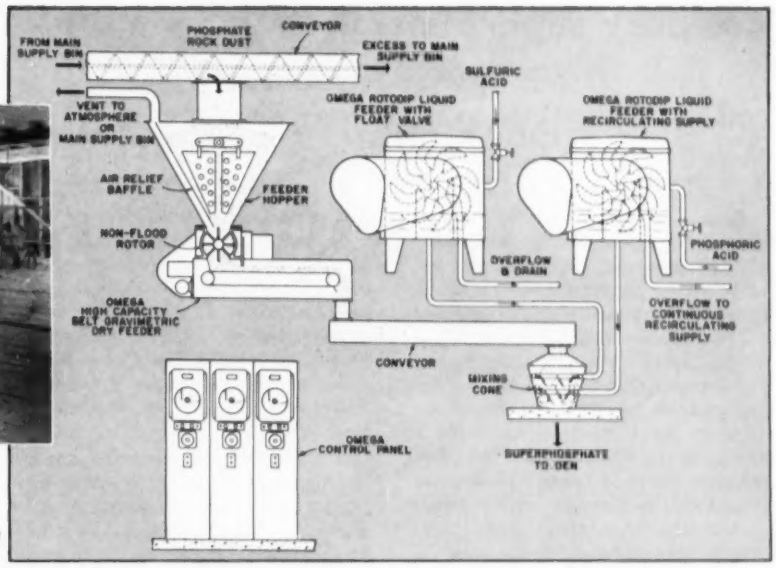
Precautionary Labeling of Fertilizing Materials

Although precautionary labeling is commonly thought of in connection with pesticides, it should be remembered that some fertilizing materials are sufficiently hazardous to require special labeling, says the California Department of Agriculture. In recent years more people have been exposed to the hazards of handling caustic or corrosive commercial fertilizers and agricultural minerals. Agriculturists have become more aware of the need for adequate warnings on labeling and the fertilizer industry has made progress in modernizing labels of its products to include precautionary labeling.

A few cases have been reported that livestock gained access to partially empty bags of sodium nitrate and ate enough of the chemical to cause their death. Similar losses have occurred from superphosphate and urea. For the past 23 years the Association of Official Agricultural Chemists has recommended that bags of nitrate fertilizers carry a warning, "Injurious to livestock."

Cautions are particularly necessary when handling anhydrous ammonia, ammonia solutions, aqua ammonia, liquid phosphoric acid, sulfuric acid, sulfur dioxide, and mixtures containing substantial amounts of any one of them.





If you are using the new quick curing method for superphosphate production . . . use

OMEGA FEEDERS

- **To control flooding even with the finest rock dust . . .**
- **To feed corrosive acids . . .**
- **To gain full 100:1 feed range with top accuracy!**

The newly developed process which cuts curing time of superphosphate from several weeks to one hour calls for the use of rock dust (as fine as 95% through 200 mesh). The Omega Hi-Weigh Feeder with built-in air relief and positive non-flood Rotolock is field-proven for this duty.

The process also calls for feeding highly corrosive acids. Omega's self-cleaning, accurate, and trouble-free Rotodip Feeder is ideally suited for this service.

Omega Hi-Weigh® Model 37-20 Belt Gravimetric Feeder.

HIGH CAPACITY — feed rates up to 40 tons per hour. (Higher with materials which are not floodable.)

ACCURACY — plus or minus 1% by weight within range.

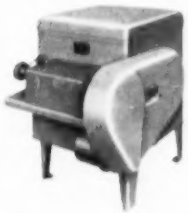
WIDE RANGE — provided by 100:1 variable speed transmission.

CONTROLLER — simple mechanical controller actuated by built-in scales. No electronic or pneumatic parts.

RUGGED CONSTRUCTION — contact areas of stainless steel with balance of feeder ruggedly constructed to assure long service in fertilizer plants.

RAPID RATE SETTING — easily achieves desired operating conditions.

EASY OPERATION & MAINTENANCE — no technical training necessary.



Omega Rotodip Liquid Feeder

— of durable, simple design accurately feeds diluted or concentrated acids, alkalies, or slurries. Request Bulletin 65-H12B.

Get the facts . . .

— on the outstanding Hi-Weigh Feeder for processing ROCK DUST. Write for Bulletin 35-N62. **Omega Machine Co., 538 Harris Ave., Providence 1, R. I.**

OMEGA MACHINE CO.
DIVISION OF
B-I-F INDUSTRIES
METERS FEEDERS CONTROLS

ordinary superphosphate for immediate use in ammoniation and granulation

. . . from recent Tennessee Valley Authority demonstration of fertilizer technology.

Recent work by TVA has led to the development of a pilot-plant scale of a process for the production of ordinary superphosphate that is suitable for immediate ammoniation and use in the formulation of granular fertilizers. A high degree of conversion of P_2O_5 to an available form and suitable physical properties are obtained in a short time (about 1 hr.) by using more finely pulverized phosphate rock, a higher acidulation ratio, and somewhat more dilute acid than are normally used. The "quick" superphosphate contains an excess of acid and therefore is suitable only for use in fertilizer formulations that are to be ammoniated.

The phosphate rock is pulverized so that 90 to 95 per cent of the material is minus 200 mesh, whereas in regular superphosphate production, rock of 70 to 80 per cent minus 200 mesh is used. Normally an acidulation mole ratio, (P_2O_5 + SO_3):CaO, of about 0.98 is used by industry; in this process we use higher ratios in the range of 1.10 to 1.15. This represents about 120 to 160 pounds of additional sulfuric acid per ton of superphosphate. Slightly more dilute sulfuric acid of 60 to 65 per cent strength is used as compared with about 70 per cent in common practice. With these conditions of acidulation, conversion of about 95 per cent of the P_2O_5 to an available form is obtained within 1 hour after mixing.

In the pilot plant the acidulation step is carried out in a TVA-type funnel mixer, and the acidulate discharges onto a continuous den of the Broadfield type. A flow diagram of the pilot plant is shown in the diagram. A denning time of about 50 minutes is ordinarily used. The superphosphate, as cut continuously from the den, is porous and friable. Several tests have been made in which the fresh superphosphate was used immediately in the adjoining TVA continuous ammoniator pilot plant in the production of granular high - analysis fertilizers. Typical grades of fertilizer produced were 4-16-16, 6-12-12, and 10-10-10.

The overacidulated superphosphate will react with more ammonia than convention superphosphate because of the excess acid present. Also, the excess acid helps to make a better mixed fertilizer by increasing the water solubility of the phosphate and by promoting granulation. The proportion of excess acid is no greater than the amount of acid used in the formulation of many grades of fertilizer. Therefore, in most cases it does not increase the cost.

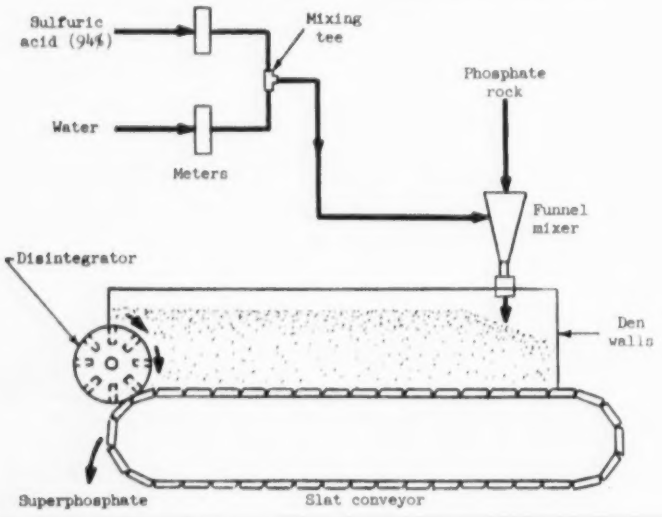
Some additional cost would be incurred in making the quick superphosphate due to the finer grinding of phosphate rock. The cost of finer grinding has been estimated by rock producers to be about $0.40 per ton of rock. The increased cost should be offset by savings in reduced inventories and handling costs and advantages of improved processing methods.

The continuous den was used in the pilot plant because it was available and because it would permit integration of acidulation and ammoniation-granulation into a single continuous process. There is no obvious reason why batch mixing and denning techniques would not be suitable for producing super-phosphate for immediate ammoniation. Retention times in batch dens are usually in a range of 5 to 24 hours. Under these conditions a higher conversion could be obtained with the same acidulation ratio, or the same conversion could be obtained with somewhat less acid.

The demonstration showed production of superphosphate suitable for immediate ammoniation as it is cut from the den about 1 hour after the rock and acid are mixed. The rock fed to the funnel mixer contained 31.5 per cent P_2O_5 and 47.6 per cent CaO ground to about 92 per cent minus 200 mesh. The acid was diluted continuously from 93 to 65 per cent H_2SO_4 just before it entered the mixer. About 0.73 pound of H_2SO_4 was fed per pound of rock, giving an acidulation mole ratio, (P_2O_5 + SO_3):CaO, of 1.14. The feed rates, product rate, and anticipated product analysis are tabulated below.

Rate, lb./hr.	
Rock	800
Acid (93% H_2SO_4)	629
Water	270
Product	1400
Product analysis, %	
Total P_2O_5	17.8
C.I. P_2O_5	1.0
H_2O	12.4
P_2O_5 conversion, %	94

Arrangement of Pilot-Plant Funnel Mixer and Den



Information pertinent to the design of the equipment

Funnel mixer		Continuous den	
Diameter	5 in.	Length	9 ft. 3 in.
Height	7 in.	Width of bed	30 in.
Slope of walls	75	Depth of bed	24 in.
Number of nozzles	2	Speed of conveyor	1.1 Ft./min.
		Speed of cutter	40 r.p.m.

data on 76% P_2O_5 'superphosphoric acid' for granular and liquid mixes

. . . from recent Tennessee Valley Authority demonstration of fertilizer technology.

Production and Properties of the Acid

Interest has been increasing recently in the use of phosphoric acid in fertilizer formulations. The acid available to industry for this purpose is the ordinary 75 per cent H_3PO_4 known as phosphatic fertilizer solution. It contains only about 55 per cent P_2O_5.

TVA has done considerable work to provide information on the properties and methods of production of more concentrated acids. An acid containing 76 per cent P_2O_5, equivalent to 105 per cent H_3PO_4, has been found to have desirable properties. This acid has been produced from phosphorus on a trial basis several times in the TVA full-scale plant used regularly to produce 75 per cent H_3PO_4. A slight modification has been made to the plant to facilitate production of the new acid which has been referred to as "superphosphoric acid."

Compared with regular 75 per cent H_3PO_4, the acid contains only about half as much water and is much less corrosive to metals and alloys. The P_2O_5 content of the acid is between that of 100 per cent orthophosphoric acid (72.4% P_2O_5) and pyrophosphoric acid (79.8% P_2O_5) both of which are solids at room temperature. The new acid does not crystallize at ordinary temperatures, although it is more viscous than regular furnace acid. Roughly half of the phosphate in the acid is present as pyrophosphate which offers some interesting agronomic possibilities. The acid is diluted easily by simply mixing it with water; when sufficient water is added to form 75% H_3PO_4, there is a temperature rise of about 60 F.

It may be possible to reduce handling costs, produce some grades of fertilizer more cheaply, and produce new and much more concentrated liquid and solid grades with the acid. For example, TVA pilot-plant work has shown that 11-36-0 liquid fertilizer can be obtained from the acid as compared with 8-24-0 material now being marketed. Other experimental work now in progress has indicated advantages for the acid in acidulation of phosphate rock to make highly concentrated superphosphate products and in the granulation of mixed fertilizers.

TVA plans to offer limited quantities of the acid for sale to industry to encourage production and use of the material.

Use in Granular Fertilizers

When used in formulations for granular fertilizers in the continuous ammoniator, the concentrated acid has the property of producing a higher temperature in the ammoniator than is obtained with conventional materials. This higher temperature, which results from the heat of dilution and reaction of the acid with water, was found to be advantageous in producing a 5-20-20 grade. Granulation occurred at a lower moisture content than when conventional acid or concentrated superphosphate was used in the formulation. Consequently the moisture content of the product was lower. Granulation efficiency was considerably better with the concentrated acid as compared with conventional acid. The data in Table I, taken from previous pilot-plant tests of the production of 5-20-20 with three different formulations, show these effects. Use of this acid in other grades had not been studied.

The demonstration illustrated production of 5-20-20 from the formulation shown in Table 2.

Operating data and results of the run were essentially the same as given in the first column of Table I. In the demonstration run a 16-mesh screen, rather than a 28-mesh screen, was used to separate the undersize from the onsize fraction; onsize re-

Table I. Data for Runs in Production of Granular 5-20-20 Fertilizer

Major source of P_2O_5:	Concentrated phosphoric acid	Concentrated superphosphate	Conventional phosphoric acid
Production rate, tons/hr.	2	2	1
Formulation, lb./ton product			
Anhydrous ammonia[1]	122 (L)	129 (L)	128 (G)
Ordinary superphosphate	937	278	814
Concentrated superphosphate	0	769	0
Phosphoric acid	288[2]	0	398[3]
Sulfuric acid (94% H_2SO_4)	0	139	0
Potassium chloride	648	643	637
Total	1995	1958	1977
Water	118	140	232
Recycle	598	304	477
Air, cu. ft./ton product	3900	2816	0
Lb. NH_3 fed/unit available P_2O_5	6.0	3.9	6.5
Moisture, %			
Input to ammoniator	6.7	8.1	14.0
Ammoniator product	4.1	5.9	9.4
Granulator product	3.6	5.6	8.7
Screened product	2.8	3.9	6.9
Temperature, F.			
Ammoniator product	225	207	177
Granulator product	200	191	152
Cooler product	98	90	104
Loss, %			
Free NH_3, by gas analysis	2.8	1.4	4.7
P_2O_5 availability in superphosphate	0.7	1.0	1.5
Screen analysis (Tyler), %			
Granulator product			
Oversize (+6 mesh)	15.6	29.5	44.4
Onsize (—6 +28 mesh)	83.9	67.8	45.9
Undersize (—28 mesh)	0.5	2.7	9.7
Cooler product			
Oversize (+6 mesh)	21.8	25.3	29.7
Onsize (—6 +28 mesh)	72.2	71.5	49.1
Undersize (—28 mesh)	6.0	3.2	21.2
Onsize material after crushing oversize	89	91	71

[1] Liquid (L) or gaseous (G); [2] 76 per cent P_2O_5; [3] 56 per cent P_2O_5

Table 2. Formulation of 5-20-20

Material	Grade	Pounds per ton of product
Phosphoric acid	76% P_2O_5	294
Anhydrous ammonia	82.4% N	125
Ordinary superphosphate	20% P_2O_5	902
Potassium chloride	60% K_2O	667
Water		125
Recycle		600

covery was lower, probably about 75 per cent.

The phosphoric acid was diluted continuously to 90 per cent H_3PO_4 before it is fed to the ammoniator. Because the viscosity of the undiluted acid is too high to permit accurate control by a rotameter, the acid had been diluted before metering. An acid distributor made from 1/2-inch stainless steel tubing of the same length as the ammonia distributor was used. It is drilled with twenty-two holes 1/16 inch in diameter and spaced to give the same distribution pattern as the ammonia distributor. This distributor has given better results with superphosphoric acid than the shorter distributor used for sulfuric acid or conventional phosphoric acid. The balance of the water needed to promote granulation was added to the anhydrous ammonia through a pipe tee located upstream from the distributor.

Other features of the pilot plant were conventional; the dryer-cooler was operated as a cooler during this run.

The economics of using phosphoric acid rather than concentrated superphosphate in the production of granular fertilizers will depend largely on the relative costs of phosphoric acid, concentrated superphosphate, and ordinary superphosphate and the cost of sulfuric acid. In the case of 5-20-20, formulated with all of the nitrogen from anhydrous ammonia, the following equation can be used to estimate whether it is cheaper to use phosphoric acid or superphosphate:

$$C = 1.57x - 0.55y + 0.13z$$

where **x** = cost of concentrated superphosphate, \$/unit of P_2O_5; **y** = cost of ordinary superphosphate, \$/unit of P_2O_5; z = cost of sulfuric acid, \$/100 lb. of H_2SO_4.

If C is greater than the cost of phosphoric acid per unit of P_2O_5, it will generally be more economical to formulate with phosphoric acid. For example, if concentrated superphosphate costs \$1.30 per unit of P_2O_5, ordinary superphosphate costs \$1 per unit of P_2O_5, and sulfuric acid costs \$23 per ton (\$1.15/100 lb.), the value of C is

$1.57x1.30-0.55x1.00+0.13x1.15 = \$1.65$

If phosphoric acid costs less than \$1.65 per unit of P_2O_5, it will be cheaper to formulate with phosphoric acid than with concentrated superphosphate.

Use in Liquid Fertilizers

The acid has been used in pilot-plant work to produce several liquid fertilizers. Liquid fertilizers that contain considerably more total plant food than the 8-24-0 solution commonly marketed have been produced by means of a continuous-type process in which streams of water, ammonia, and the acid are mixed.

Clear solutions with grades as high as 12-36-0 have been produced in the pilot plant. These solutions have been stored at temperatures of 32° F. and above for one week without salting out. Potash (KCl) has been added to these solutions to obtain 10-10-10, 9-18-9, 7-21-7, and 5-15-10 grade solutions that also did not salt out when stored at temperatures of 32° F. and above.

Roughly half of the phosphate in the 12-36-0 solution is in the form of orthophosphate, and the remainder is presumably present largely as pyrophosphate. The presence of more than one form of phosphate offers some interesting agronomic possibilities that do not exist with the conventional orthophosphate liquids.

In the initial greenhouse tests the 12-36-0 liquid appeared to be equal to or slightly better than the control liquid which was diammonium phosphate. Field tests with the 12-36-0 liquid are now being conducted by several state experiment stations.

PROPERTIES OF SUPERPHOSPHORIC ACID

(Data are approximate and must be confirmed.)

Concentration: About 76 per cent P_2O_5, that is, between 100 per cent H_3PO_4 (72.4% P_2O_5) and pyrophosphoric acid (79.8% P_2O_5).

A ton of the acid contains 1520 pounds of P_2O_5, whereas a ton of ordinary 75 per cent H_3PO_4 contains only 1090 pounds of P_2O_5.

Specific gravity: About 1.90 at 75° F.

Freezing point: Acid is fluid at room temperature, whereas 100 per cent H_3PO_4 and pyrophosphoric acid are solids.

Viscosity at room temperature: About 800 centipoises at 75° F., or roughly that of heavy motor oil.

Temperature rise upon dilution: Dilution of the acid to 75 per cent H_3PO_4 results in a temperature rise of about 60° F.

Corrosion: Much less than with 75 per cent H_3PO_4 at given temperatures.

Methods of production:

(1) Add phosphorus pentoxide to orthophosphoric acid.

(2) Operate phosphorus burning acid plants that are built of graphite at higher temperature.

(3) Operate other phosphorus burning acid plants at same temperatures but increase heat removal by gas coolers or the recycle of cooled acid.

Link-Belt in New Plant

Link-Belt Company expects to move into its new Los Angeles plant over the weekend of October 12, it has been announced by Robert C. Christiansen, southern general manager of Link-Belt's Pacific Divisions.

The move from its plant at 361 South Anderson Street to 1200 Sycamore Street in Montebello, about 10 miles east of downtown Los Angeles, will include the office, engineering department, district sales office and factory branch store. Production facilities are also being moved and are expected to be completed by November 15.

The new Los Angeles plant will more than double Link-Belt's manufacturing facilities in the Los Angeles area.

OBITUARIES

Charles C. Concannon, 68, retired former chief of chemistry division, Bureau of Foreign and Domestic Commerce.

Arthur W. Belleau, 65, general manager of Lyons Fertilizer Co., Tampa, Fla., August 23, in a local hospital.

E. Lyn Bryson, 58, owner of the Woodruff Oil and Fertilizer Co., Woodruff, S.C., died in an accident August 16 on his farm.

Dr. Roy Herman Kienle, 61, American Cyanamid research director, September 3, at a Stamford, Ct., hospital.

Kenneth T. King, 65, retired duPont executive, died Aug. 8 at his home in Alden, Mich.

Louis D. Machette, 82, board chairman, the Nitragin Co., died August 20 at his home in Milwaukee.

Ralph H. Musser, first president of the Soil Conservation Service of America, and long time SCS official, died at his home in Washington D. C., September 11.

William J. Purcell, 52, general manager of Munson Mill Machinery Co., died unexpectedly September 14, at his home in Utica, N. Y.

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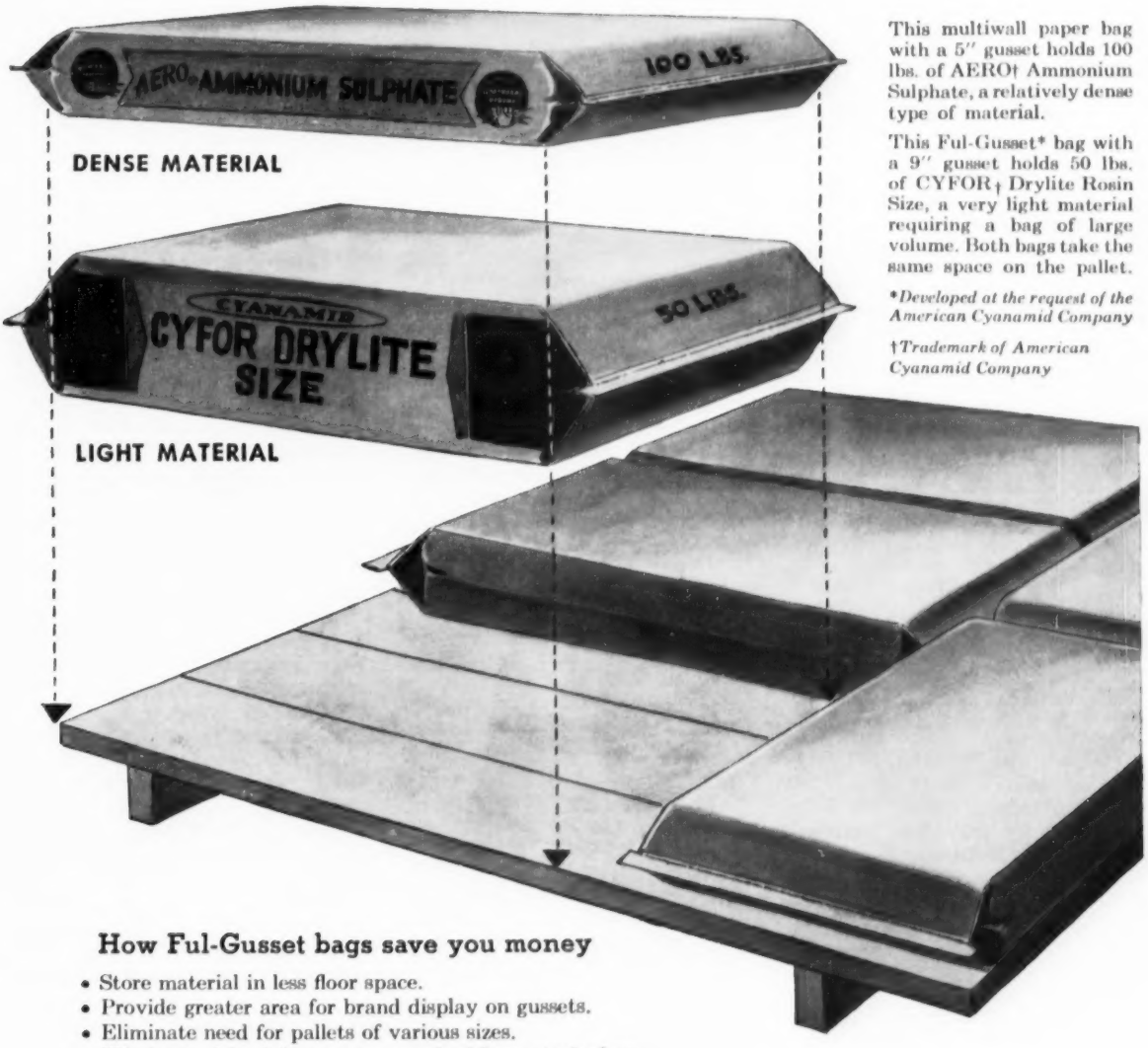

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Liquid Nitrogen and Georgia Pastures

by Ralph L. Wehunt
Extension Agronomist
Soils and Fertilizer
University of Georgia
College of Agriculture

The prospect of growth and the accompanying needs has set agronomists at the University of Georgia College of Agriculture Extension Service planning toward increased yields. They foresee the need for high per-acre yields, more acres in soil-conserving crops, and more acres in feed production and pastures.

To meet needs as they arise, agronomists have outlined a ten-year plan.

J. R. Johnson, Extension agronomist-project leader, explains that plans call for increases in alfalfa to 100,000 acres; Coastal Bermuda to a million acres; sericea lespedeza to 500,000 acres; oats to a million acres; rye to 300,000 acres, and winter grazing to 1,700,000.

Assuming that progress continues at the rate it has gone in the past few years, the agronomists feel certain these goals can be reached. Improved permanent pastures now occupy something like 1,700,000 acres, and Extension agronomists estimate that this figure will be 4,000,000 by 1965.

The carrying capacity of pastures now is .8 cow per acre. The agronomists look toward the day when it can be increased to 1.25 cows per acre.

And how is the job to be accomplished?

Ralph Johnson and other agronomists who work with him—W. H. Gurley, D. L. Branyon, J. F. McGill, J. B. Preston, W. H. Sell, Ralph Wehunt, H. A. Inglis, and P. J. Bergeaux—set these pre-requisites to obtaining the goals they have set: To do the job it will take 1,500,000 tons of lime; 1,800,000 tons of mixed fertilizer, and 175,000 tons of actual nitrogen per year in Georgia.

This compares with 350,000 tons of lime being used now each year, 1,058,000 tons of mixed fertilizer, and 46,000 tons of actual nitrogen.

Phenomenal changes have occurred in Georgia's agriculture in recent years. One of the most significant changes has been the increased proportion of total income derived from livestock and their products. From 1945 to 1956, livestock income increased from approximately $123 to $312 million, respectively. To feed this enlarged livestock population, it is necessary that more attention be devoted to production of pasture and forage crops.

One of the most limiting factors in feed production in Georgia is inadequate fertilization, especially nitrogen. About 5½ million acres of land in Georgia are devoted to open improved, open unimproved and woodland fenced pastures. Also, over one million acres are planted to winter grazing crops. Yet, only 11 percent of the total fertilizer tonnage used in Georgia is applied to pasture or hay cropland. Approximately 83 percent of the total fertilizer used is applied to land planted to major cash crops. The remaining six percent is used on vegetable, fruit and nut crops. These figures point up the critical need for a more intensive educational program to promote pasture fertilization know-how.

Part of such a program was undertaken by the Georgia Agricultural Extension Service last fall. It was the most comprehensive pasture fertilization demonstration program ever conducted in the state. To encourage the use of more nitrogen on grazing crops, liquid nitrogen demonstrations blanketed Georgia last fall like the morning dew. One hundred and ten farmers joined hands with their county agents to: (1) determine the importance of adequate nitrogen fertilization for forage production (2) estimate the value of fall nitrogen applications and (3) acquaint themselves with nitrogen in a liquid form. This demonstration program was sponsored by Nitrogen Division, Allied Chemical and Dye Corporation.

These 110 outstanding Georgia farmers are among those who are willing to try new materials and techniques and to evaluate their potential farm use. They realize, whether they want to or not, that farmers today are living in an atomic age—full of fast changes. Such farmers are looking for new and better ways to obtain more profit on every dollar invested in fertilizer. In other words, they want to know how to get the most "umph" from their fertilizer. These 110 farmers felt that liquid nitrogen offered possibilities to improve their over-all farm operation.

The 110 demonstrations were located on all soil areas of the state—62 in south and 48 in north Georgia. The test plots were planted to all types and mixtures of winter grazing crops. Oats alone were used in 33 demonstrations. The remaining fields were planted to various mixtures, such as oats and rye grass, oats and crimson clover and others. The demonstrations were used to graze all kinds of livestock.

Each demonstration consisted of three adjacent acres treated as follows: (1) one received 100 pounds nitrogen top dressing in fall and none in spring, (2) one acre received 50 pounds nitrogen top dressing in fall and 50 pounds in spring, and (3) one acre received none in fall and 50 pounds in spring. Mixed fertilizer was applied according to soil test or to general fertilizer recommendations. Most of the cooperators used 500 pounds 4-12-12 fertilizer at planting.

Seventy-seven farmers completed the demonstrations. The remaining 33 farmers turned in incomplete reports for various reasons, including drought, overgrazed, improper solution application and other factors.

Table 1. Number of Farmers Showing Preference for Various Top Dressing Treatments

Treatment	North Georgia	South Georgia	Total
100 lbs. N in fall 0 lbs. N in spring	19	19	38
50 lbs. N in fall 50 lbs. N in spring	15	9	24
0 lbs. N in fall 50 lbs. N in spring	2	1	3

The demonstrations were marked by a large sign which stated in big letters "Nitrogen Demonstration" and three small signs pointing out treatments. These signs did much to improve the value of the demonstrations. Thousands of farmers and business people were able to view the marked difference in plant growth which resulted from liquid nitrogen applications.

One of the main objectives of these tests was to obtain information on the value of fall nitrogen applications. Therefore, all the farm cooperators were asked if the 100-pound-per-acre fall nitrogen application gave out before spring growth. About 50 percent of the farmers answering this question stated "Yes" whereas the remaining 50 percent said "No." About the same percentage of farmers answered "No" to this question in south as those in north Georgia.

Each farm cooperator was asked which of the three treatments produced the largest amount of total grazing and to rank them 1, 2 and 3 in order of preference. The results of this question are shown in Table 1.

Twelve of the 77 farmers who completed the demonstrations did not indicate a treatment preference.

Both south and north Georgia farmers ranked the 100-pound-per-acre fall nitrogen application as the best treatment. Approximately 58 percent of the farmers indicated the heavy fall nitrogen application produced the greatest amount of total grazing. About 41 percent indicated a preference for the split fall and spring application treatment. The treatment that received no nitrogen in the fall and 50 pounds in the spring was rated poor by all but three farmers. In general, the farmers interested only in grazing seemed to prefer all their nitrogen being applied in the fall whereas those interested in grazing and grain production indicated a preference for the split nitrogen application treatment. These results suggest that Georgia farmers interested only in forage production would find it profitable to apply more or all of their nitrogen in the fall.

These demonstrations provide an opportunity to obtain opinions about liquid nitrogen straight from the "horse's mouth" or the farmer himself. Many of the farm cooperators evaluated liquid nitrogen for the first time on these demonstrations. Generally speaking, the majority seemed to like liquid nitrogen and many indicated they planned to use it again. Some of the more frequent favorable remarks about liquid nitrogen by farmers were as follows: cheaper than most solid forms of nitrogen; easy to apply and saves labor; can be applied faster than solids; one of best and most practical nitrogen sources; well satisfied and plan to use it again; seems to take hold faster than solids in dry seasons; good nitrogen source for pastures and forage crops; produced as much yield as solid nitrogen.

Some of the tests were overgrazed and a few farmers indicated liquid nitrogen did not produce as much growth as they felt it should. A few farmers also indicated it was difficult to obtain an even distribution of liquid nitrogen. One or two were displeased because the custom applicator was unable to apply liquid nitrogen to wet fields. A few farmers felt that the heavy fall nitrogen application damaged their clover stand.

All the county agents who assisted in establishing the 110 demonstrations were asked to give their opinions and comments relative to use of liquid nitrogen. Many of their remarks were similar to those of the cooperating farmers. Virtually all the agents seemed to like liquid nitrogen and indicated it could play a big part in developing the agricultural economy of their counties. The most frequent remarks made by the county agents about liquid nitrogen were as follows: more economical than most other nitrogen sources; as effective for producing forage growth as other nitrogen sources; believes farmer will apply more nitrogen in liquid than dry form; easy to apply and saves farm labor; excellent source of nitrogen for forage and pasture crops.

These 110 demonstrations did much to point up the value of nitrogen for fall grazing. The demonstrations were viewed by thousands of farmers. The tests received widespread publicity in state newspapers and over radio stations.

Forage crops adequately fertilized with nitrogen provide a cheap source of protein. Nitrogen, once the most expensive fertilizer element, is now plentiful and the cost is low in terms of other items purchased by the farmer. However, many farmers are using inadequate rates of nitrogen. This fall is a good time for farmers to think this serious problem over and to make a start toward more economical forage production by applying more nitrogen.

These demonstration farmers' acceptance and favorable reaction to liquid nitrogen is as effective and will continue to gain in popularity in Georgia. When properly applied, liquid nitrogen is as effective as solid forms for promoting plant growth. Therefore, many Georgia farmers may find it to be their cheapest source of nitrogen. It can, in many cases, be the "Flowing Magic" that provides the "Umph" which will promote "Dark Green and Fat" pastures in Georgia.

Associations

Dr. Vincent Sauchelli, widely-known research scientist with a varied background in agriculture obtained both in the United States and abroad, has joined the staff of the National Plant Food Institute as chemical technologist. At present Sauchelli is concentrating his efforts on an NPFI-sponsored study of sampling and chemical analysis of fertilizer. One of the results of this project it is hoped will be a substantial saving to the industry by a reduction in material overages in formulations. Dr Sauchelli comes to the Institute from Davison Chemical Co., Division of W. R. Grace & Co., where he served as director of agricultural research.

Chemical Control Conference Oct. 17

An important conference on chemical control procedures and problems in the fertilizer industry, sponsored by the Chemical Control Committee of the National Plant Food Institute, will be held in the Park Room, Shoreham Hotel, Washington, D. C., on October 17, Dr. Vincent Sauchelli, Chemical Technologist for the Institute and Chairman of the Committee, has announced.

Dr. Sauchelli explained that the meeting will be scheduled for the period when the Association of Official Agricultural Chemists meets in Washington, to enable many chemists attending the other meeting to participate in the conference.

Chemists in the fertilizer industry and state regulatory service personnel particularly are invited to attend the meetings.

The program for October 17 follows:

MORNING: Introductory remarks by Dr. Sauchelli; "The Chemical Analyst in Today's Industry" by Dr. Walter J. Murphy, Editorial Director, American Chemical Society; "F.A.R.I. Chemical Control Project" by Robert P. Thornton, Thornton Laboratories; "The Control Chemist—Key Man in Modern Fertilizer Production" by M. D. Sanders, Director of Research, Swift & Company, Plant Food Division; "Collaborative Study on Triple Superphosphate" by H. L. Marshall, Olin Mathieson Chemical Company for the Institute's Chemical Control Committee and a general session.

AFTERNOON: "The Magruder Sample Work" by Dr. Sam F. Thornton, F. S. Royster Guano Company; "Need for Standard Samples of Phosphate and Potash" by Carrol H. Perrin, Research Chemist, Canada Packers Ltd.; "The Relationship of the Chemical Control Office to the Local Fertilizer Industry" by A. S. Carter, director, Seed Control and State Chemist Services, Purdue University; "Some Comments on Sampling Instruments" by J. R. Archer, International Minerals and Chemical Corp.; "Rapid Method for Determining Urea in Ammonia Solutions" by J. A. Smith, Sohio Chemical Co.; "Review of Nitrate-Chloride and Tetraphenyl Boron Method" by E. D. Schall, Indiana State Chemist Office; followed by a general session.

Pac. N. W. Program Well-Rounded

As we went to press the Pacific Northwest Plant Food Association program, for their October 3-5 Sun Valley annual convention included a fine array of speakers, but was incompleted. Jack Criswell, v-p of the Agricultural Ammonia Institute; TVA's T. P. Hignett on latest technical developments in the fertilizer industry; W. R. Alstetter, NPFI on the promotional program; Frank Taylor—a report on the Association's soil testing program; Grant Braun, chairman of the Soil Improvement Committee on the Demonstration Projects, and Rod Bertramson on Salesmanship.

One more speaker was expected on the list. The conference program has left plenty of time for the recreation in which Sun Valley abounds. Special emphasis has been placed on the ladies program.

Committees are headed by General Chairman Todd Tremblay. Chairmen: Program, Karl Baur; Entertainment, Charles Bourg; Registration, Elwood Lentz; Golf, Grant Braun; Raffle, Ray Whitcomb; Ladies entertainment, Mrs. Jean McCollum; Allied Trades & Reception Committee: Cliff E. Culley, chairman; Jack Johnson, Lee Hansen, Trevor Steele, Grant Braun, Glenn Holt.

Solutions Men Meeting Nov. 17-19

Howard R. Lathrope, agronomist for Nitrogen Division of Allied Chemical & Dye Corporation at Indianapolis will be one of the featured speakers on the 1957 convention program of the National Fertilizer Solutions Association at Cincinnati, Ohio, November 17-19.

His presentation will be "Successful Educational Meetings," beamed primarily at the dealer level of the industry, and will cover the essential details of how to call and hold a successful meeting.

This part of the program will be particularly important to many dealers in the fertilizer solutions field who are expected to attend the meeting.

A panel of experts from the Ohio State University will discuss "Essentials to Success" as applied to the liquid fertilizer industry.

Dr. John K. Pfahl, assistant professor of Finance at the University will talk on "Sales Ethics." Before coming to Ohio State, Dr. Pfhal was a member of the staff at Massachusetts Institute of Technology, as assistant in marketing.

Another member of the panel on Essentials to Success is Dr. Gordon Ryder, whose subject will be "Agronomy." Dr. Ryder is extension agronomist for southwestern Ohio.

"Economics", third phase of the panel discussion, will be presented by Dr. John W. Sharp, associate professor in Agricultural Economics for the College.

The panel discussion has been programmed for the afternoon session, starting at 2:00 p.m. on Tuesday, November 19, and will be followed by a discussion on "Additives to Fertilizer Solutions." Presentations under this subject heading will include "Recent Developments of Insecticides and Herbicides;" "Chelate Applications;" and "Gibberellic Acid." Speakers on these subjects will be outstanding research men in the agricultural chemical development field.

New officers of the National Joint Committee on Fertilizer Application for 1957-1958 were elected at the annual meeting in Palo Alto, Calif. They are: Dr. W. H. Garman, chief agronomist of the National Plant Food Institute, secretary; Dr. Oscar A. Lorenz, vice chairman of the Vegetable Crops Department at the University of California, chairman; and Dr. B. A. Krantz, Extension agronomist of the University of California, vice chairman, in charge of program arrangements for the 1958 meeting. The 1957 meeting was held in cooperation with the American Society for Horticultural Science and the Western Soil Science Society.

Dr. Lorenz Elected N J C F A Head At 33rd Annual Meet

Dr. Oscar A. Lorenz was elected chairman of the National Joint Committee on Fertilizer Application at the 33rd annual meeting at Stanford University. He is vice chairman, Vegetable Crops department, University of California.

Named vice chairman was Dr. B. A. Krantz, extension agronomist, University of California, and Dr. W. H. Garman, NPFI chief agronomist, was reelected secretary of the committee. Dr. Krantz will be in charge of program developments for the 1958 meeting.

The meeting, held in cooperation with the American Society for Horticultural Science and the Western Soil Science Society, attracted more than 400 representatives from the fertilizer industry and scientific societies.

Speakers and their topics included the following:

Dr. Hans Jenny, Department of Soils and Plant Nutrition, University of California, Berkeley, "Availability of Various Phosphorus Sources in California Soils;" Dr. W. W. Jones, Department of Horticulture, University of California, Riverside, "Urea Sprays on Citrus;" Dr. Francis Broadbent, Department of Soils and Plant Nutrition, University of California, Davis, "Nitrification of Ammonia-Containing Compounds;" Dr. Leon Bernstein, U. S. Salinity Laboratory, Riverside, "Movement of Soluble Salts in Irrigated Beds;" Dr. Walter P. Mortensen, Western Washington, Experiment Station Puyallup, "Placement of Liquid and Dry Fertilizers on Vegetable Crops in Washington;" Dr. F. H. Leavitt, Shell Development Co., "Application of Liquid and Gaseous Fertilizers;" and Dr. N. F. Childers, Department of Horticulture, Rutgers University, "The Occurrence and Methods for Correcting Nutrient Deficiencies in Deciduous and Small Fruit Plantings in the United States."

The 1958 meeting will be held in cooperation with the American Society of Agronomy, August 25-29, at the University of Wisconsin.

NAC to Step Up Educational Program

At their 24th annual meeting, the National Agricultural Chemicals Association talked plans to step up their program to make clear to city dwellers as well as farmers the importance of crop chemicals to the national welfare.

Jackson Vernon, Niagara Chemical division president was elected NAC president, with Charles H. Sommer, Jr., Monsanto Chemical as vice-president. Directors elected included George Ferguson, Geigy; John Logan, Olin Mathieson; Warren Moyer, Chipman Chemical.

An interesting point brought out

during the meeting is the demand which exists for biological scientists, who can command starting salaries from $375-$450 monthly for BS degrees; $525-650 for Ph.D degrees, and quick advancement for qualified men to $10,000-15,000 a year. More than half the top administrative personnel in that industry have come up through the ranks and have scientific backgrounds.

Fertilizer, Lime Short Course Held By Ga. Groups

Agronomists of the University of Georgia College of Agriculture Extension Service and Experiment Stations have joined forces with the Georgia Plant Food Educational Society to bring fertilizer and lime salesmen the latest research findings on use of their products in Georgia.

The fertilized-lime short course was held August 27-29 at the University of Georgia Center for Continuing Education at Athens. Extension Agronomist Ralph Johnson, short course chairman, said that attendance was quickly oversubscribed by advance registration.

Eighteen speakers presented a thorough study of fertilizer and lime use in Georgia. For the first two days its faculty concentrated on presenting basic information on soils and plant growth. They outlined how Georgia soils were formed, major soil series of Georgia and their characteristics, soil testing, how soils supply nutrients to plants, and how plants absorb nutrient elements. The second day, speakers discussed how plants manufacture food, movement of nutrients and manufactured foods in plants, influence of environment on plant growth, importance of water in crop production, movement and role of water in plants, and influence of soil reaction on plant nutrient availability.

Later lime, nitrogen, phosphorus, secondary and trace elements were considered; then discussed were: importance of plant breeding to efficient fertiilzer use, fertilizer and lime potential in Georgia, how fertilizer and lime fit together into Georgia's changing agriculture, more profits from efficient use of fertilizer and lime on major crops, fertilizing and liming for more efficient crop and livestock production.

Russell Coleman, executive vice president of research and education, National Plant Food Institute, spoke at the banquet. His topic was The Fertilizer Industry and Education—Partners in Progress.

Agronomist Johnson concluded the program with a report on what the Extension Service is doing to bring about greater fertilizer know-how.

Serving with Johnson as general chairmen are Dr. T. H. Rodgers, head of the University's Agronomy department, and J. Cooper Morecock, Jr. of the Georgia Plant Food Educational Society.

Grange Asks Long-Range Policy

The National Grange has again called for the development of a long-range, comprehensive national policy in the field of soil, water, wildlife and related renewable natural resources.

The organization's director of research, Gordon K. Zimmerman, in Congressional testimony, claimed that current difficulties, conflicts and inefficiency in programs related to these resources will continue until such a policy is framed.

Soil Scientists and Fertilizer Men to Meet in Atlanta

Soil scientists and fertilizer industry representatives will meet in Atlanta, Ga., at the end of October to attend the annual Southeastern Fertilizer Conference and the annual Southern Soil Fertility Conference. Both sessions are slated for the Dinkler-Plaza Hotel.

The Southeastern Conference, sponsored by the National Plant Food Institute, is intended primarily for NPFI members, although invitations have been extended to USDA and college personnel. It will be held on October 31.

The Soil Fertility Conference, under joint sponsorship of the Southern Regional Soil Research Committee and NPFI, will follow on November 1, and is open to Institute members as well as college and USDA representatives.

A large part of the Southeastern industry session will be devoted to a discussion of the subject of what influences farmers in the Southeast to purchase fertilizer. This discussion will be based on a study being conducted for NPFI by National Analysts, Inc., of Philadelphia.

M. S. Williams, NPFI chief agricultural economist, will report on the Philadelphia firm's study. This will be followed by an appraisal of factors influencing the use of fertilizer in the Southeast by H. L. Dunton, head, Department of Agronomy, Virginia Polytechnic Institute, and Webster Pendergrass, dean, College of Agriculture, University of Tennessee.

Russell Coleman, NPFI Executive vice president, will speak at the session on the Institute's expansion program.

The Soil Fertility Conference on November 1 will open with a film entitled "The Bright Promise of The American Farm Market" which was produced by FORTUNE magazine.

A progress report on sulfur studies will be presented by H. V. Jordan, soil scientist, USDA and Mississippi State College; L. E. Ensminger, professor in soils, Alabama Polytechnic Institute; and J. A. Lutz, assistant professor of agronomy, Virginia Polytechnic Institute.

Highlights of the University of Georgia College of Agriculture soil fertility program will be discussed by Glenn W. Burton, chairman, Agronomy Division; H. F. Perkins, assistant research agronomist; J. R. Johnson, extension agronomist, J. W. Fanning, head, Department of Agricultural Economics, and Ralph Wehunt and P. J. Bergeaux, associate agronomists.

A grade-ratio report will be given by J. W. Fitts, head, Department of Soils, North Carolina State College, and J. G. Fiskel, associate professor of Soils, University of Florida, will present a trace elements report.

Richardson Reports Automation in Formulation

A new punched card system to increase accuracy and speed of batch weighing by taking formulation out of the hands of the operator has been developed for users of electronic proportioning equipment, Richardson Scale Company has announced.

Integrated with an automatic proportioning panel, the Richardson Punched Card Reader (PCR) system makes use of handy punch cards which have been previously coded for prescribed batching formulas. The system starts to function immediately when the operator inserts one of these cards into PCR unit, pulls a lever to lock it in place and presses a start button. From this point everything works automatically, with an exact cycling of any number of bulk materials through the various stages of weighing, discharge, mixing and conveying away for bagging.

Claimed to be one of the most significant advances in automatic proportioning within recent years, the system is especially valuable for processors who require a quick change-over of formulas or who seek a greater degree of privacy in their formulation. If the proportioning of ingredients is regarded as confidential, the arrangement provides management with a way of issuing operating instructions in a code known only to itself.

Each punched card represents a complete formula and can be used over and over again. Operations may be duplicated by pressing a repeat button or they may be varied by successive insertions of new cards. A permanent record of programming can be obtained whenever separate cards are employed for each operation.

By means of indicating lights Richardson's PCR Control registers the various weights called for by the inserted card in the order in which each ingredient is batched for weighing. When checked against the dial scale readings, these weights tell the operator how accurately the proportioning operation is proceeding without actually telling him data regarding the type of ingredients used.

The new Richardson PCR Control, initially engineered and designed for IBM cards, transmits to the control panel all information stored in the punched card, and can read from IBM, Underwood Samas, Remington-Rand or other punched cards. When used with "Select-O-Weigh," Richardson's automatic proportioning system, the new controls permit combinations of any number of ingredients selected in variable sequence.

The Richardson PCR Control was first installed in a Southern feed mill to gain electronic control over 21 feeders, one hopper scale, a premix unit and mixer. Similar installations, designed for use with Select-O-Weigh, are said to be possible for a large number of industries handling bulk materials.

The feed mill system was installed to provide a choice of four processing cycles: 1) full automatic punch card operation, 2) full manual, 3) manual weighing/automatic mixing, or 4) automatic weighing/manual mixing control.

A batch stop counter permits the operator to repeat a given formula for any desired number of times merely by setting a dial on the counter. An inventory counter with totalizer records in pounds the amount of each ingredient used as well as the total accumulated amount delivered per hour, shift or day.

The initial system includes an extensive series of safety interlocks, such as under and overweight signals, "off tare" controls, "dial override" signals, and compensation adjustment dials for each of the 21 feeders. The system is completely dust-proof to insure a trouble-free operation of its electrical components.

Punched cards are divided into 21 sections corresponding to the 21 feeders, and the quantities of desired ingredients are registered in decimal form from zero to 5,000 pounds in ten pound increments.

changes

GARMAN

Dr. W. H. Garman has been appointed regional director for **National Plant Food Institute** in the Northwestern States, **Dr. Russell Coleman,** executive vice president of the Institute, has announced.

He is the first of four regional directors to be appointed under the Institute's program to expand its research and educational activities. In addition to the four regional directors, other field personnel will be added to the Institute's staff to work under the regional directors in servicing particular States and areas.

Dr. Garman, chief agronomist for the Institute, will continue to serve as its chief agronomic consultant in addition to carrying on his new assignment in the Northeast, which will include New York, Pennsylvania, New Jersey, Maryland, Delaware, the New England States, and possibly West Virginia.

He will give particular attention to Pennsylvania, Maryland, Delaware and possibly West Virginia, and may have a field supervisor to assist him in servicing New York, New Jersey and the New England States, to be located in the New England area. Dr. Garman will headquarter in the Institute's Washington offices.

Specifically, Dr. Garman's duties will involve liaison between the fertilizer industry and the Land-Grant Colleges, public agencies, bankers, farm organizations, agricultural press, radio farm directors and others who work directly with farmers and are concerned with research and educational work related to agriculture. As chief agronomic consultant to the Institute, he will continue to handle liaison with national professional societies such as the American Society of Agronomy and the Soil Science Society of America, and will continue to work with the National Joint Committee on Fertilizer Application.

* * *

The American Agricultural Chemical Company August 27 announced that it has contracted to purchase the physical assets of the **Buhner Fertilizer Company, Inc.** of Seymour, Indiana and Danville, Illinois.

* * *

Victor Chemical has acquired the **Federal Chemical Co.'s** 2700 acres of phosphate lands at Mount Pleasant, Tenn., and their phosphate ore washing plant.

* * *

U. S. Borax has announced dropping merger negotiations with "another concern" (reputed to be Olin Mathieson) by mutual consent.

* * *

Smith-Douglass Co., Inc., has announced election of **R. S. Rydell** as a vice-president for chemical products.

He has been president of **Coronet Phosphate** division of Smith-Douglass since he joined the company in 1954.

In his new position, Rydell will direct the production and sale of Smith-Douglass chemical products produced by Coronet Phosphate Co., near Plant City, Florida, where

RYDELL

phosphate rock is mined for use in fertilizer and feed supplement; **Texas City Chemicals, Inc.,** Texas City, Texas, which produces fertilizer, sulfuric acid, phosphoric acid and dicalcium phosphate; **San Jacinto Chemical Co.,** Houston, Texas, producers of anhydrous ammonia; **Smith-Rowland Co.,** producers of nitrogenous tankage; and potassium silica fluoride, manufactured by the parent Smith-Douglass Co. at Norfolk, Va., Streator, Ill., and Plant City, Fla.

Sale and production of Smith-Douglass fertilizer will be directed by Vice-President **James H. Culpepper,** who will head the company's fertilizer products division, which handles all farm and specialty fertilizer products.

R. F. Hopkins, president of the San Jacinto Chemical Co., division at Houston, since it merged with Smith-Douglass in 1953, has also been elected vice-president of Texas City Chemicals, Inc., and in addition to directing those activities, will head new products research for the company.

Vice-President **James A. Monroe** directs overall company operations, under **W. R. Ashburn,** who was elected Smith-Douglass president August 1. **Ralph B. Douglass** is chairman of the Board.

STATEMENT OF OWNERSHIP, ETC.
OF
COMMERCIAL FERTILIZER
AS OF OCTOBER 1, 1957

1. *Publisher, editor, etc.:*
Publisher: Walter W. Brown Publishing Co., Inc., 75 Third St., N.W.
Editor: Bruce Moran, 75 Third St., N.W.
Business Manager: V. T. Crenshaw, 75 Third St., N.W.

2. *Owner (if corporation, name of corporation, and immediately below the names of all stockholders owning 1% or more of stock):*
Walter W. Brown Publishing Co., Inc., 75 Third St., N.W.
Ernest H. Abernethy, 75 Third St., N.W.
Virginia T. Crenshaw, 75 Third St., N.W.

3. *Bondholders, mortgages, etc.:*
None.

Signed: ERNEST H. ABERNETHY, *President*

Sworn to and subscribed before me, a Notary Public, this 24th day of September, 1957.

MARY C. LAYMAN, *Notary Public.*
My commission expires February 29, 1960.

CLASSIFIED ADVERTISING

For Sale, Exchange and Wanted Advertisements, same type now used, EIGHT CENTS a word for one insertion; TWELVE CENTS a word for two insertions; FIFTEEN CENTS a word for three insertions, and FOUR CENTS a word for each insertion more than three; ADVERTISEMENTS FOR THIS COLUMN MUST BE PAID IN ADVANCE.

HELP WANTED

WANTED: Combination lead burner and sulphuric acid man for chamber type plant. Also, shipping foreman. Write, giving full details of experience, educational background, age, salary expected, and references. Box #21, c/o Commercial Fertilizer, 75 - 3rd St., N.W. Atlanta 8, Ga.

SITUATIONS WANTED

WANTED: Position as plant superintendent, experienced in transportation and complete fertilizer plants. For reference and business resume, write Box 19, c/o Commercial Fertilizer, 75 - 3rd St., N. W. Atlanta 8, Ga.

BUSINESS OPPORTUNITIES

MANUFACTURING AND SALES REPRESENTATION WANTED: To manufacture and sell the newest thing in automatic weighing (patents applied for) for bulk, free-flowing material. Can be used for blending and/or packaging. Write Box #12, Commercial Fertilizer, 75 Third St., N. W., Atlanta 8, Ga.

EQUIPMENT FOR SALE

FOR SALE: Rotary Dryers 5' x 30', 5' x 40', 4'6" x 50', 5' x 67', 6' x 60', 9' x 80'. (1) Pressure Tank 13,000 gal. 220#. Also Mixers, Storage Tanks, Screens, Elevators. Send us your inquiries. Brill Equipment Company, 2402 Third Ave., New York 51, N. Y.

FOR SALE: Dewatering Presses, Louisville 8 Roll 36"; Davenport No. 1A, No. 2A; J. B. Model W. Hammer Mill; Ribbon Mixers, 336 and 56 cu. ft.; Gemco 6' dia. Conical Blender; Rotary Steam Tube Dryers 6' x 45', 4' x 30'. Steel & Aluminum Tanks 400 to 23,000 gal. Also, Pulverizers, Conveyors, etc. Perry Equipment Corp., 1426 N. 6th St., Philadelphia 22, Pa.

NEW EQUIPMENT AT FACTORY PRICES. NEW CONVEYOR BELTING FROM HUGE, FRESH STOCK. Vibrating screens from $443.00. Crushers from $527.00. Feeders from $275.00. All types of bucket elevators and belt conveyors. Steel troughing idlers and return rolls. Conveyor parts, accessories, and drives. All machines built in the Bonded factory. Buy your factory-fresh conveyor and elevator belting from one of the largest stocks in United States, Canada and Mexico. 4-ply, 28 oz. duck, $\frac{1}{8}$" x $\frac{1}{32}$" rubber covers: 14", $2.83 ft.; 16", $2.97 ft.; 18", $3.29 ft.; 20", $3.80 ft.; 24", $4.26 ft.; 30", $.5.21 ft.; 36", $6.18 ft. Many other widths, plies, and specifications in our fresh stock. FREE CATALOGUE AND PRICES: more than 200 models of Bonded machines for chemical, fertilizer, mining, quarrying, aggregate and clay industries. BELTING SAMPLES FREE. Bonded Scale Co., 42 Bellevue, Columbus, Ohio. Phone days HI. 4-2186; Evenings AX. 1-2213.

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